FOUNDER'S HUMAN CAPITAL AND THE ENTREPRENEURIAL PROCESS DURATION

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Doctor of Philosophy

ASTON UNIVERSITY

March 2022

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Thesis Summary

This thesis presents three quantitative empirical studies, utilising two US cohorts from the harmonised Panel Study of Entrepreneurial Dynamics (PSED), to advance our understanding of the relationship between nascent entrepreneurs' human capital and duration to different entrepreneurial outcomes. Each chapter provides a distinct perspective across three dimensions: (1) human capital, age and sector impact duration to a profitable outcome, (2) the association of human capital and age with the founder's exit; and finally, (3) human capital impact on the duration to a profitable outcome with a different spatial scope of sales.

Following the introductory chapter, in chapter 2, the human capital perspective is used to investigate how the level of human capital and the founder's age influence the likelihood of profitable venture creation in a shorter duration. This chapter extends research in nascent entrepreneurship that hitherto has largely overlooked the duration perspective to an entrepreneurial process outcome. This chapter stresses that hi-tech start-up particularly benefits from the nascent entrepreneur's higher educational attainment in terms of shorter duration until the profitable outcome, and find that age has a non-linear relationship with the speed of the profitable venture outcome.

Chapter 3 examines how a founder's human capital factors and age influence the likelihood of a founder's exit, and duration to an exit, from the entrepreneurial process. This chapter also extends its focus to human capital interactions to establish which combinations are more likely to reduce an earlier prospect of a founder's disengagement from the entrepreneurial process. The chapter, also adds to the literature on how founders, with higher human capital, learn quickly and make intelligent choices to disengage without incurring heavy personal and societal costs. A non-linear relationship is found between the founder's age and the duration to disengagement.

Finally, chapter 4, seeks to understand how a founder's human capital affects the profitable outcome, and the duration to such an outcome, at the different spatial scopes of sales. This paper takes a new approach and adds to the international entrepreneurship literature by clarifying how the founder's human capital factors impact rapid (born global) and incremental (international new ventures) spatial scope strategies differently. Among the general human capital, a university degree is valuable across all types of spatial scopes of sales in terms of profitable venture creation in a shorter duration. However, start-up experience (specific human capital) only tends to be vital for international scope in terms of the shorter duration to create a profitable new venture.

Altogether, the thesis advances our understanding of the important role of the founder's human capital dimensions in nascent entrepreneurship, in the duration either to a profitable venture creation or to exit, which is underdeveloped in the existing literature. The thesis paves the way for future, both theoretical and empirical research, into nascent entrepreneurship process duration by analysing the direct effects of various aspects of social capital.

Keywords: Entrepreneurial Process Duration, Human Capital, Duration Studies, Nascent Entrepreneurship, Panel Study of Entrepreneurial Dynamics (PSED)

Dedication

Bau Ji
(Syed Mahmood-ul-Hassan Pirzada)

Abba Jan
(Mir Tahir Shah)

Dad
(Pirzada Shahid Kaleem)

Mom
(Asima Shahid)

Acknowledgements

I cannot thank Professor Tomasz Mickiewicz, my principal supervisor, enough for him being such a wonderful and super approachable mentor. It has been delightful to learn from his expertise in the field of entrepreneurship and to know him as a seasoned and experienced supervisor who is generous, patient and always willing to extend support to his students. I can also guarantee that when it comes to Professor Tomasz, one can confidently and easily tick all boxes on any list for an ideal PhD research supervisor.

I am also extremely grateful to my associate supervisor, Dr Anna Rebmann for her dedication, even sometimes being willing to attend my supervisory meetings while on her work travel or holidays, and for her valuable suggestions and advice on my project. Both with Tomasz and Anna, I found our meetings extremely insightful and very practical, and I always got a feeling of their sincere commitment to my project and mentoring me in general.

I would also like to give a special thanks to Professor Paul Reynolds, my second associate supervisor, who is one of the pioneers of the Panel Study of Entrepreneurial Dynamics (US PSED I and II) research programme, for his encouragement and guidance on my PhD project.

I am very appreciative of the Postgraduate Research Team (PGR) for their exceptional support in all administrative matters, throughout my PhD Programme, and I always found them very helpful.

I must express my gratitude to Mahjabeen for your undemanding nature and constant support. Last, but not least, my utmost love to Wahab, Rabab, and Abdullah for your care and understanding, and now let's get ready for some outdoors, a few DIY projects, and gardening.

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Chapter 1: Introduction, Rationale, and Contribution of Research

1.1 Introduction

The thesis fits into the field of entrepreneurship research. It contains three quantitative empirical studies on the interrelated themes of entrepreneurial process duration and outcomes in respect of a profitable outcome, founder's exit, and profitable outcomes with different spatial scopes of sales.

Policymakers and researchers have considered start-ups as a solution to improve economic growth and decrease the unemployment rate (Sorenson *et al.*, 2021) and were therefore interested in finding ways to facilitate entrepreneurial activity (Lattacher *et al.*, 2021). Policymakers see entrepreneurs as key agents for economic growth (OECD, 2021; Ehrlich, Li and Liu, 2017) even though the entrepreneurship field is still developing (McMullen, Brownell and Adams, 2020). In turn, human capital growth promotes a country's innovation capacity and therefore has been positively linked to economic growth (Gruzina, Firsova and Strielkowski, 2021). Human capital has also been considered a key driver to achieve and sustain high societal welfare levels (Caglayan, Flamini and Jahanshahi, 2021). Human capital strength can help in sustained economic growth (Gavas and Pleeck, 2021) and enable countries to compete effectively in the global economy (The World Bank, 2020). Quantitative measures of human capital (e.g. educational attainment) are significantly associated with economic growth (Affandi, Anugrah and Bary, 2019) also when measured from the gross domestic product per capita perspective (Pelinescu, 2015). On the micro level, human capital, one of a firm's key intangible assets, can be an important differentiator in a company's strategy and market value (World Economic Forum, 2020). Entrepreneurship researchers have therefore tried to better understand factors that can explain nascent entrepreneurship outcomes (Klyver, Honig and Steffens, 2018).

In this introductory chapter, I argue that the wider societal costs, individual opportunity costs, and the economic importance of entrepreneurship make it important for us to understand how an individual's human capital factors can help us to better understand and predict not only the entrepreneurial process outcome but also the duration to different types of outcomes. I also explain why the other individual factors (age), sector (hi-tech/non-hi-tech), and spatial scope of sales (regional-national-international) matter in the entrepreneurial process outcomes and how my research fits into the relevant literature. Given the importance and contribution of entrepreneurship in an economy, we need to understand how to support entrepreneurs by

focusing on certain types of human capital and I explain why the context (spatial scope of sales) within which entrepreneurship takes place matters, and how my research fits into this literature.

1.2 Entrepreneurship

Entrepreneurship involves both the new venture creation as well as the introduction of new products and processes innovation to an existing business (Cabrer-Borrás and Rico Belda, 2018). The scholarly field of entrepreneurship has emerged from management and has therefore inherited the functionalist approach, however, entrepreneurship is not simply a pursuit of profit maximisation (Bylund and Packard, 2022). New venture performance has remained difficult to measure, as many entrepreneurs do not start a new venture for monetary gain (Dabić *et al.*, 2021). Therefore, organisational behaviour and psychological science research have actively focused on understanding what influences entrepreneurs to create ventures, grow them, and also what makes them exit the process (Murnieks, Klotz and Shepherd, 2019).

1.2.1 Nascent entrepreneurship

The term 'Nascent entrepreneur' was first used by Paul Reynolds in 1992 (Lanivich, Lyons and Wheeler, 2021), whereby a nascent entrepreneur is defined as an individual who, on his/her own or in a team, entered the entrepreneurial process to create a new venture (López, Neves and González-Morales, 2021; Davidsson and Gordon, 2016). Alomani, Baptista and Athreye (2022) defined nascent entrepreneurs as individuals seeking to create new ventures through opportunity discovery, strategizing, and resource acquisition. It has been operationalised as individuals considering themselves to be involved in the venture creation process; have engaged in some venture creation activity during the past 12 months; expecting to be the owner or part owner of new venture; and while they are in the venture creation process, they have not created an operating business (Simon C. Parker, 2011). This is the definition that I will be using based on the PSED operationalisation.

1.2.2 Founder / Nascent entrepreneur

Entrepreneurial behaviour relates both to individual choices and to actions towards new venture creation, which are based on individual characteristics (Dileo and García Pereiro, 2019). Individual actors conceive and initiate entrepreneurial activity, and are conscious of the profit potential and time demands associated with their entrepreneurial journey (Lanivich *et*

al., 2022). It has also been argued that it is the people, not macro-economic conditions, market features, access to capital, or geographic attributes who create new ventures (Hechavarria, Renko and Matthews, 2012). A founder is the one who creates a new venture and even if the venture has been created by a team, the individual (lead) founder's attributes have been considered vital to explaining new venture creation (Shepherd and Patzelt, 2021b). The founder has also been defined as the creator and initiator of a start-up and remains at the heart of entrepreneurial process research (Spinelli Jr. and Adams, 2012). Entrepreneurship scholars have therefore continued to find factors and their impact to explain nascent entrepreneurship outcomes (Klyver, Honig and Steffens, 2018) including decisions around exiting the entrepreneurial process (Alomani, Baptista and Athreye, 2022). Studying individual-level nascent entrepreneurs' factors can provide insight into those factors that help individuals to act more entrepreneurially than others (Lanivich, Lyons and Wheeler, 2021). Although research has identified that founder characteristics are vital for new venture performance, caution is advised when interpreting their effect because more resources may not be always better (Debrulle *et al.*, 2020).

1.3 Human Capital

Human capital comprises an individual's education, knowledge, training, skills, and competencies that facilitate the creation of personal, social, and economic well-being (Vassilev, 2018b). Individuals' educational attainment, work experience, start-up industry experience, and start-up experience have been used by entrepreneurship scholars as indicators to measure human capital (Unger *et al.*, 2011). Founders' human capital provides them with dynamic managerial capabilities that contribute toward a successful new venture creation (Razmdoost, Alinaghian and Linder, 2020) through efficient resource acquisition and development of further competencies during the entrepreneurial process (Miozzo and DiVito, 2020; Razmdoost, Alinaghian and Linder, 2020; Davidsson, 2015).

However, individual-level human capital studies have not necessarily focused on human capital contribution to the duration of profitable venture creation. This is important because pursuing an entrepreneurial opportunity involves opportunity costs, particularly for skilled individuals who are capable to create and grow successful new ventures (Spinelli Jr. and Adams, 2012). I have therefore focused on the nascent entrepreneurs, and their human capital levels, to assess not only the outcome impact of the human capital factor but also the duration perspective, as skilled individuals have been considered more conscious of the opportunity costs involved in the venture creation process.

1.3.1 Human Capital Theory

Becker (1964) presented the human capital theory, which argued that individuals' human capital factors like education, knowledge, experience, or skills improve their effectiveness. The human capital theory emphasises the founder's characteristics that aid entrepreneurial development (Sun and Fong, 2021). Utilising the human capital theory, researchers have further developed it to examine different human capital aspects associated with entrepreneurial success (Martin, McNally and Kay, 2013; Unger *et al.*, 2011).

Human capital, an intangible productive resource (Weisbrod, 1966), has received attention in theoretical research as a key determinant of the venture creation process outcome (Simon C. Parker, 2011). In entrepreneurship research, human capital and related diverse skill set can affect new venture creation and be useful to face start-up-related challenges (Krieger *et al.*, 2021). The human capital theory is useful in my context because it provides a framework on the relationship between new venture success (chapters 2 and 4 herein) and failure (disengagement, in chapter 3) (Rauch and Rijsdijk, 2013). Human capital theorists have also argued that human capital provides an edge to individuals in opportunity recognition, arranging funding, and problem resolution under the uncertainty that surrounds new venture creation (Allen *et al.*, 2020). Human capital has therefore been considered a key building block to understand why certain actors outperform others (Thomas and Murphy, 2019), which has also attracted entrepreneurship scholars to study the role of human capital in the entrepreneurial process (Vyas and Vyas, 2019; Dimov, 2017; Marvel, Davis and Sproul, 2016).

Venture creation is a complex process, first because of the diversity of founders, and second because the entrepreneurial process has different stages and because different functional or disciplinary lenses may be applied (Wasserman, 2012). Founders, before entering the venture creation process, have different experiences and characteristics that impact the entrepreneurial process and its outcome (Shepherd and Patzelt, 2021b). Individuals with high human capital have been argued as more likely to be successful in launching and managing new ventures (Saridakis, Frankish and Storey, 2021), and therefore, human capital factors and/or their proxies (e.g. education, experience, and age) have been considered as key constituents behind new venture's performance-related theories (Soto-Simeone, Siren and Antretter, 2020). Entrepreneurs' higher level of human capital facilitates their decision-making and mapping of alternatives, particularly in the nascent phases (Alomani, Baptista and Athreye, 2022). This is because nascent business ventures, due to the newness and limited resources, face market uncertainties (Becherer, Haynes and Helms, 2008).

Human capital comprising education and work experience has been classified as general human capital, and prior entrepreneurship experience and industry experience are classified as specific human capital (Canavati *et al.*, 2021; Bergmann, 2017). General human capital (i.e. education and general experience) is considered to be useful in new venture creation, whilst specific human capital (i.e. firm-specific experience and knowledge) is of use in a particular organisational or sector context (Simon C. Parker, 2011). General and specific human capital factors have also been found to be substitutes in venture survival and therefore it has been argued that estimating the relationship between a founder's various human capital factors and venture creation process outcome, without studying individual factor impact, would lead to misinterpretation (Cauchie and Vaillant, 2016). Moreover, the trade-off (productivity vs. transferability of human capital factors) between different types of human capital is not clear (Silos and Smith, 2015; Gervais, Livshits and Meh, 2008) and nor does the relationship between these factors in terms of them being substitutes (Sloane, Battu and Seaman, 1996) or complementary.

Both the effect of an individual's human capital stock and the trade-off between different types (i.e. general and specific) of human capital on a venture's longevity has remained unclear (Cauchie and Vaillant, 2016). Huggins, Prokop and Thompson (2017) have argued that even the same type of human capital effect ventures differently, and in particular micro-enterprises are only weakly influenced by the general human capital as compared to SMEs, which see a significant effect. The strategic contribution of human capital to the entrepreneurial process can be ascertained by examining the pattern of associations between various human capital variables with the decisions to enter the venture creation process and with the outcome of that process (Schenkel, Hechavarria and Matthews, 2009).

It has therefore been suggested that entrepreneurship research should investigate not only the investment in human capital but also the outcome of the processes (e.g. applying learning and knowledge, transfer of human capital) that are inherent to the human capital theory (Unger et al., 2011). I aim to change our understanding of human capital in entrepreneurship and contribute to entrepreneurship theory through a conceptual and empirical case, studying the duration advantages of a founder's human capital in entrepreneurial process outcome, whether it be a shorter duration to a profitable venture creation; understanding of founder's exit dynamics; and founder's human capital's contribution on a shorter profitable venture creation with different (wider to narrower) spatial scope of sales.

1.3.2 Human Capital and Time Duration

Human capital has been studied using static variables but not so much emphasis has been made on time and the process. Understanding founders' behaviour and cognition abilities regarding the assessment of the venture being pursued and the duration of the entrepreneurial process is an important but understudied area of entrepreneurial research (Lanivich, Lyons and Wheeler, 2021). Moreover, as processes unfold over time and could have a different outcome (e.g. venture being created or founder disengaged from the process), a better understanding of duration is required (Shim and Davidsson, 2018). Duration is also important because pursuing an entrepreneurial career involves opportunity costs that would be different for every founder, and so does their expectations on the pace of the process towards achieving their venture creation goal (Davidsson and Gruenhagen, 2021).

Entrepreneurs differ in terms of their capacity to adapt to the changing environments that can influence the entrepreneurial process (Bi, Boh and Christopoulos, 2021). Our knowledge of the comparative gains from different types of founder's human capital and the effect of time on comparative advantage in terms of the outcome (e.g. profit) is unknown (Oberschachtsiek, 2012). This is also important from the founder's perspective as the duration (i.e. speeding up) of the venture creation is seen as a way to not run out of time (Stayton and Mangematin, 2019), hence can allow us to better understand different types of outcomes, including founder exit. Speed during the entrepreneurial process (e.g. quick at new product development) can provide many benefits to these founders that include timely generation of the cash flow and establishing legitimacy (Schoonhoven, Eisenhardt and Lyman, 1990; Stayton and Mangematin, 2019). Despite time being an important factor for nascent ventures, being resource constraint (Rosenbusch, Brinckmann and Bausch, 2011), has not received enough attention in terms of how founders benefit from their skills and time management to improve their competitive advantage and achieve a positive venture outcome (Sirén *et al.*, 2020). It is also important to address a general concern around the human capital approach to the entrepreneurial outcome that higher human capital levels will drive better returns in all types of new ventures (Oberschachtsiek, 2012) and that is why in my project I have used hi-tech/non-hi-tech differentiation, as a mediator and/or as a control, to better account for any possible effects on the duration and outcome of an entrepreneurial process.

1.4 Entrepreneurial Process

New venture creation has remained a central theme in entrepreneurship research and, in the last two decades, literature on new venture creation has been considerably developed

(Shepherd and Patzelt, 2021b). However, it has been suggested that the new venture creation process research should see the process as a directional and temporal journey to an outcome, and therefore focus on the duration perspective of the entrepreneurial process (Davidsson and Gruenhagen, 2021).

1.4.1 Entrepreneurial Process Duration

Davidsson and Gruenhagen (2020) have identified two broad categories of process-based research. The first is the process situated event, which focuses on something occurring within the process. Second, process pattern, which is processual and involves the study of process (e.g. speed, time, duration to process outcome) rather than discrete events within the process. My chapters focus on linking the initial conditions (e.g. founder's human capital) to process outcome (e.g. profitable venture creation or founder's exit) from a duration perspective. Entrepreneurial process duration has been defined as the distance between different time points (Jones and Coviello, 2005), which in my chapters means from entering the start-up process to the process outcome (i.e. profitable venture creation or exit). This is important because although the new venture creation process research has studied new venture creation as a dependent variable (Shepherd, Wiklund and Dimov, 2021), many of these studies are variance-based, looking at whether an individual becomes a nascent entrepreneur or not. Moreover, new venture creation and their growth have remained the founders' key purposes, however, knowledge as to which factors connect new venture creation to their development into an established entity has remained rather limited (Shepherd and Patzelt, 2021b).

The entrepreneurial process is time-variant and therefore temporal dynamics are at the core of entrepreneurship (Leong, 2021). Duration, the amount of time from inception to its resolution (i.e. successful venture creation or abandoning process), has been termed as one of the key characteristics of the venture creation process because it can shed light on how long one would take to launch a profitable venture, and if there is a critical period when the risk of disengagement rises (Shim and Davidsson, 2018). Duration has been defined as both the rate of progress during the entrepreneurial process towards a successful outcome or termination (Davidsson and Gruenhagen, 2021) and as the temporal length of a process or outcome (Aguinis and Bakker, 2021). Studying the duration is important because time is one of the most important resources for entrepreneurs as their decisions to pursue an opportunity and their basic needs are time-bound and can seriously impact the potential of creating a new venture (Lanivich, Lyons and Wheeler, 2021). The new venture creation process varies in duration, from a few months to over 10 years (Reynolds *et al.*, 2018) and by bringing in the temporal dimension, researchers are faced with challenges around the design and methods

(Davidsson and Gruenhagen, 2021). Similarly, Momtaz (2021) has argued that time considerations influence entrepreneurial decision-making but methodological challenges and/or data limitations have somewhat restricted studying entrepreneurship process duration even when time-to-event models are widely used in entrepreneurship.

The entrepreneurial process involves the entrepreneur's journey over time and is extremely sensitive to initial conditions and antecedent variables (Leong, 2021). Moreover, the economicity of time, whereby time is considered a tangible commodity, makes individuals aim at an optimal allocation by using it competitively (Sharma and Blomstermo, 2003a). The time perspective has been argued as a key constituent of entrepreneurial behaviour and venture growth (Prasastyoga, van Leeuwen and Harinck, 2021). Moreover, not paying due attention to temporal dynamics in entrepreneurship research would likely hinder an in-depth understanding of different individual factors and their contributions to the entrepreneurial process outcome (Tang *et al.*, 2021) and this is why I also want to detangle the relationship between founder's human capital and entrepreneurial process duration.

Entrepreneurial process-based studies have focused on the understanding of the venture creation process outcomes (i.e. venture creation or exit); required resources (e.g. human capital); performance (e.g. sales and/or survival); and environmental factors (e.g. environmental dynamics and/or sector), but the majority of them have lacked the temporal (entrepreneurial process duration) aspect to the venture outcome. It has been suggested that by focusing on temporality (duration), contributions can be made to better understand how founders engage within the entrepreneurial process and how it impacts different process outcomes (Wood and Bakker, 2018).

It has been argued that though time is an important feature of human activity and that temporal concerns may impact entrepreneurial outcomes, the theorisation of entrepreneurial action has not been greatly pursued (Wood, Bakker and Fisher, 2021). Davidsson and Gruenhagen (2020) have therefore suggested entrepreneurial process-based research as a directional and temporal journey toward a venture outcome emphasising the duration to an outcome. They have further argued that new venture creation process researchers, inside or outside of entrepreneurship research, do not have many options of a process oriented theory to choose from, and therefore suggesting further scope for new theory.

1.4.2 Entrepreneurial Process Outcome

The founder can experience or choose to opt for one of the entrepreneurial process outcomes (i.e. venture created, founder exit, or choose to continue with the process of venture creation), and there is a lack of clarity on why some founders act more quickly than others when considering the different entrepreneurial process outcome decisions (Capelleras *et al.*, 2010). This is particularly important because founders with higher human capital levels tend to think differently about continuing with the venture creation process or disengaging from it (Kato and Honjo, 2015), based on many personal (e.g. opportunity cost, sunk cost) and context (e.g. hi-tech/non-hi-tech, spatial scope of sales) related factors that come with the human capital endowment. It is therefore important to account for all possible outcomes when studying the relationship between founder characteristics and entrepreneurial process outcomes. All three empirical studies in my dissertation have therefore accounted for the competing risks in addition to traditional hazard models to ensure the findings are more accurate and robust. Competing risks are present when subjects are exposed to multiple mutually exclusive failures, and the occurrence of one failure is likely to hinder the occurrence of other events. It is therefore important to use appropriate methods to account for competing risks and avoid any misleading inferences (Haushona *et al.*, 2020).

1.5 Duration studies and the Panel Study of Entrepreneurial Dynamics (PSED)

It has been argued that many interesting time variables that could determine key entrepreneurial decisions and outcomes have been largely unexplored partly due to either data or methodological challenges (Momtaz, 2021). Time-based research and longitudinal studies are a likely fit as variables of interest that are measured at multiple points in time and account for reverse causality (Lévesque and Stephan, 2020). Examining nascent stages of the entrepreneurial process has particularly remained challenging due to the lack of longitudinal, systematic, and large-scale studies on the nascent entrepreneurial process, which the PSED research programme (survey) attempted to address (Davidsson and Gordon, 2012). The PSED is a representative sample of nascent entrepreneurial activities and new venture emergence, and these datasets have been continuously used for their historical significance, generalisability, large size, and not following convenience sampling (e.g. considering shop managers as entrepreneurs), or no survival-biased (Crawford *et al.*, 2022). PSED survey applied random sampling to the nascent stages of the entrepreneurial process (i.e. before ventures become operational), which helped in reducing survival bias and the real-time follow-up on developments regarding the start-up process has helped in reducing any hindsight bias or memory decay issues (Davidsson and Gordon, 2012). Global

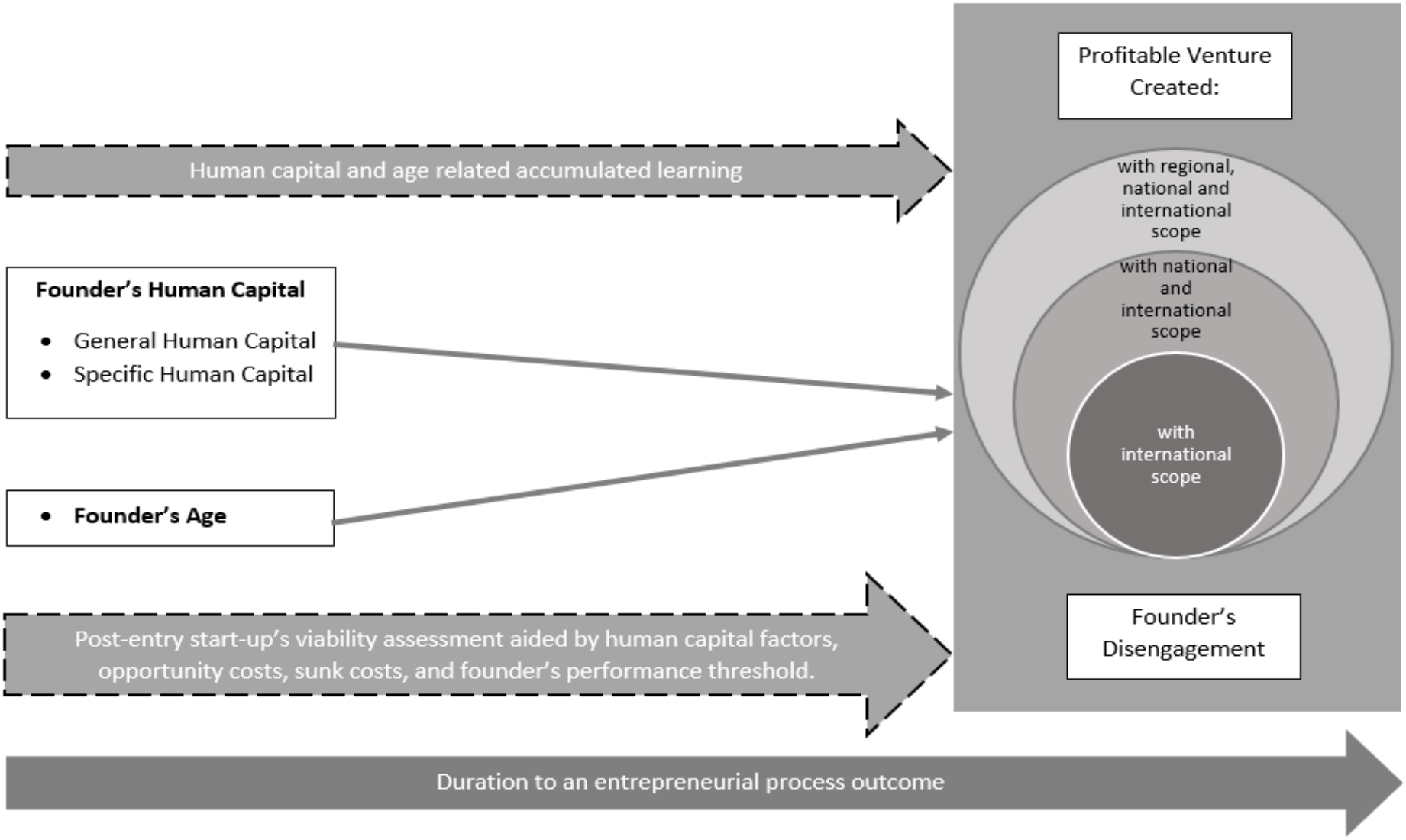
Entrepreneurship Monitor (GEM) is another programme (survey) that has helped to advance scientific entrepreneurship research, however, the GEM theoretical framework is based on the economic approach and institutional theory, whereas, the PSED has the demographic and cognitive approaches (Ramos-Rodríguez *et al.*, 2015). PSED data have an edge over other datasets (e.g. Global Entrepreneurship Monitor - GEM) because of their longitudinal nature that can capture duration perspective in nascent entrepreneurship (Shim and Davidsson, 2018); time separate independent and dependent variables (Davidsson and Gordon, 2012); and it is this feature of the PSED datasets that allow us to make a robust case for causation (Townsend, Busenitz and Arthurs, 2010). Another systematic project, Kauffman Firm Survey (KFS), was undertaken nearly the same time (2005) to the PSED II. The key difference again here is that PSED focuses on nascent entrepreneurship and start-up activities, whereas KFS track new firms that starts operating, for which the data was sourced from the Dun & Bradstreet (D&B) credit rating database (Robb and Reynolds, 2009).

I have used two US Cohorts (i.e. PSED I and II) from the harmonised PSED dataset, which offer a nationally representative sample of nascent entrepreneurs from the United States of America. The reason to use these two cohorts from the harmonised dataset of five cohorts was to account for both general (education and work experience) and specific (industry experience and start-up experience) types of human capital factors in my study. PSED datasets are one of the only publicly available datasets (Hechavarría, Matthews and Reynolds, 2016) that provide data on the time founders take to complete the process, be it the creation of a new venture or a founder disengagement (exit) from the process (Gartner and Shaver, 2012; Hechavarría, Matthews and Reynolds, 2016).

The PSED surveys have followed a rigorous random-digit-dialling selection process, resulting in a non-zero probability of being sampled by every nascent entrepreneur in a country, which makes these datasets more generalizable and representative sample in the field of nascent entrepreneurship (Crawford *et al.*, 2022; Hechavarría, Matthews and Reynolds, 2016). In PSED I, founders were tracked over 4 years, and for PSED II they were tracked over 6 years in PSED II (Hechavarría, Matthews and Reynolds, 2016). From a duration perspective, some founders manage to create new ventures in a few months, while some take several years to achieve that goal. Moreover, the duration to disengage from the venture creation process is longer than establishing a profitable new venture (Reynolds, 2018). This highlights the need to clarify the role of individual factors in different types of entrepreneurial process outcomes and the duration of those outcomes.

I have explained the cause of counterintuitive and conflicting evidence in extant research on the influence of human capital on not only entrepreneurial process outcome but more importantly on the duration of that outcome. By using advanced Cox competing risk modelling, I also contribute to the adoption of a more robust methodological handling of PSED data, one of the well-recognised available longitudinal studies/datasets on nascent entrepreneurs. I have also theorised and tested a novel set of moderating effects on entrepreneurial process duration and outcomes.

Figure 1.1 Conceptual framework of the thesis



1.6 Chapter Summaries

1.6.1 Chapter 2

Chapter 2 attempts to assess the contributions of the founder's human capital in the likelihood of establishing a profitable new venture in a shorter duration. It provides a contemporary view of the founder's human capital factors, founder's age, and industry type (i.e. hi-tech/non-hi-tech) to the duration of profitable venture creation, from the human capital theoretical perspective. The founder's human capital has been studied concerning venture survival but not from an observable venture outcome (e.g. profitability) and duration perspective. Moreover, not many entrepreneurial process studies have considered both general and specific human capital factors in terms of the process outcome and have rather focused on different types of start-up activities within the entrepreneurial process. The general/specific human capital distinction is important because of the differences in the scope of their applicability. General human capital is applicable to a wider range of economic activity, whereas specific human capital has a narrower scope as skills and knowledge acquired in a particular setting/context are less transferrable in a new setting (Capelleras *et al.*, 2010). This chapter, therefore, wants to clarify not only the impact of general and specific human capital on the duration and likelihood of creating a profitable new venture but also investigate any differences based on the type of industry (hi-tech/non-hi-tech).

Human capital theory predicts that founders with higher human capital will outperform others (Martin, McNally and Kay, 2013; Ployhart and Moliterno, 2011) as these founders are better at applying their learning throughout the process and would therefore achieve higher productivity (Teng, Li and Tanna, 2021). Moreover, human capital, in general, provides a founder with better venture-handling skills (Madsen, Neergaard and Ulhøi, 2003); provides them with social networks with higher human capital endowments (Anderson and Miller, 2003); and provides them with a diverse set of knowledge, skills, and abilities that make them good at transferring their learning and achieve better venture outcomes (Martin, McNally and Kay, 2013). Human capital is also found to provide founders with better learning adaptability, resilience, and strategic agility (Shela, Ramayah and Noor Hazlina, 2021), and better at applying their learning and knowledge more broadly to gain a competitive advantage (Ployhart, 2021).

However, we should also be cautious about individuals' human capital and opportunity cost aspects. This is important because the founder's general and specific human capital provide them with better analytical skills, key networks, and customer and market insights. However,

both types of human capital also result in different opportunity cost perceptions at the individual's end. In terms of the founder's general human capital, it increases their chances for alternate employment opportunities (job market) as general human capital can be utilised in different contexts, whereas the specific human capital is more restrictive and only positively affects opportunity cost when the choices are more likely to gain from the current context (Criaco *et al.*, 2014). Furthermore, in terms of innovativeness that can help in earlier profitable venture creation, both types of human capital can have a different impact. Research has also found that general human capital is positively linked to product/service innovation but the specific human capital has an adverse effect in terms of the founder's prior knowledge, and innovation, as they tend to remain close to the familiar practices (Marvel, Wolfe and Kuratko, 2020). I have therefore empirically tested the impact and direction of both types of human capital on the likelihood of an early launch of a profitable venture.

The general perception of more is better when it comes to human capital has also been tested in this chapter because, particularly when it comes to the educational attainment level, the outcome may be slightly different. Gimeno *et al.* (1997) found a non-monotonic effect in terms of the founder's educational attainment, whereby higher degree holders outperformed college degree holders but founders with post-high school qualifications were also better performers than the rest. Such impact could be because post-high school qualification provides higher general knowledge that is good enough for these individuals in terms of the ability to spot viable opportunities and confidently pursue them (Cauchie and Vaillant, 2016). I have, therefore, studied the education variable as a categorical measure to better understand the relationship in terms of duration to the profitable outcome and whether it is a linear relationship as the majority of studies have found or not.

This chapter has also brought in sophistication in terms of studying the high-tech vs. non-hi-tech ventures as they differ in risk (hi-tech riskier), size of initial investment required (hi-tech higher), and the possibility of super-profits (hi-tech higher) (Doroshenko, Malykhina and Somina, 2018). Moreover, hi-tech ventures being closely linked to the scientific activities of education and research institutions (Antoniuk *et al.*, 2017) may also benefit from the founder's general human capital (e.g. education level). Research has found that founders with high educational attainment (human capital), regardless of industry type (i.e. hi-tech or low-high-tech venture) they are working on, are more likely to voluntarily close (i.e. liquidation and merger) their ventures (Kato and Honjo, 2015). However, empirical research and clarity on nascent entrepreneurs in terms of their human capital and the duration to a profitable outcome from the entrepreneurial process is not present. I have, therefore, empirically tested for such an effect on the duration to profitable venture creation. Industries also vary in terms of duration

to outcome because of the nature of entrepreneurship across contexts (Lévesque and Stephan, 2020), hence I have expanded on this aspect in this chapter as well.

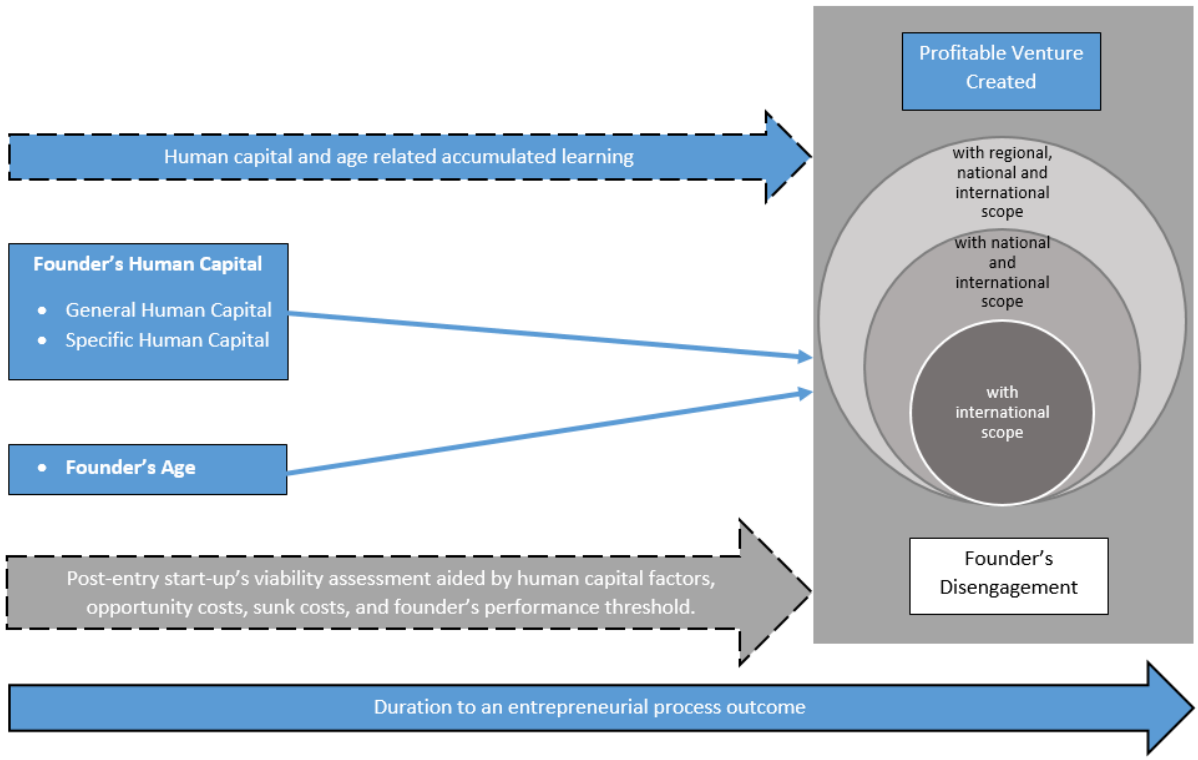
In addition to the human capital factors, the founder's age has been considered important in predicting the likelihood of entrepreneurial success (Gielnik, Zacher and Frese, 2012) but the founder's age has been mostly used as a control variable (Zhao et al., 2021). Moreover, the theoretical role of a founder's age on entrepreneurial success has remained rather unclear, in terms of whether younger founders are more successful than their older counterparts or not (Zhao *et al.*, 2021). Some have found age to affect oppositely, with middle-aged and beyond founders being most likely to be successful in new venture creation (Azoulay et al., 2020). Others have argued that younger founders are believed to be more likely to take higher risks, given the lower cost of exit being better placed to get alternative opportunities, hence more likely to create new ventures than older founders (Belenzon, Shamshur and Zarutskie, 2019). Zhao *et al.* (2021) have also argued that human capital is an age-related mechanism and inadequate attention to age's theoretical role (i.e. how older founders compare with younger ones in terms of successful venture creation) has restricted our understanding of age-success relationships. I have therefore empirically tested the direct relationship of age groups to check the type of relationship with duration to a profitable outcome, given that although the human capital based theoretical framework supports the positive effect of age, the younger age should not be taken as a lower level of human capital accumulation (Zhao *et al.*, 2021).

The chapter scope has helped me to contribute to the nascent entrepreneurship literature and theory by focusing on and detangling the founder's human capital (general and specific) factors and duration to an observable (profitable) outcome. The contribution from the duration perspective in this chapter has been that founders with higher human capital are better placed for the earlier wins (e.g. new product development), and enjoy better legitimacy that helps them in securing funding, placing them in a better position to create a profitable new venture in a shorter period of time. My theoretical contribution is extending the human capital theory, both in terms of an observable entrepreneurial process outcome and duration perspective, driven by the nascent entrepreneurs' human capital factors (both general and specific). This theoretical contribution was made by utilising one of the most recognised nascent entrepreneurship longitudinal datasets (PSED I & II) and running advanced survival models (i.e. competing risks). This will help both the researcher and practitioners to be able to better predict duration gains in terms of speed to profitability, helping to avoid individual and societal losses. I have also highlighted the predictive power of the human capital theory in providing a clear understanding of the entrepreneurial process duration benefits of the founder's

educational attainment (general human capital) in different sectors (i.e. hi-tech and non-hi-tech).

Summarising the above considerations, in chapter 2, I have therefore empirically tested the predictive power of the human capital theory, particularly from the duration perspective which is one of the novelties of my study, by disentangling different types of human capital to provide a better understanding of the relationship between founder's human capital and the duration to profitable venture creation. Figure 1.2, on the next page, illustrates the conceptual framework for this chapter.

Figure 1.2 Chapter 2 in relation to the conceptual framework



1.6.2 Chapter 3

Entrepreneurial exit is attracting a growing interest to understand this phenomenon better (Mathisen *et al.*, 2021). First, the founder's exit is a significant event in the entrepreneurial process that is harder to predict and, second, despite advances in entrepreneurial exit literature, the actual exit outcomes (i.e. duration to founder's exit in my chapter) are not properly measured and understood (Hohen and Schweizer, 2021; DeTienne and Wennberg, 2016).

Founder exit can be seen as a trade-off between founders' economic interests and their psychological attachments to the new venture creation process (Wasserman, 2012) and a better insight into how founders' human capital effect that decision would benefit the research on entrepreneurial exit. Founders, by choosing to voluntarily exit the entrepreneurial process, may avoid incurring any additional personal losses (Shepherd and Patzelt, 2021b). I, therefore, wanted to elaborate and emphasise that a founder exit should not be taken as a negative outcome, because founders' exit decision can help them partially recover their investment through divesting from the entrepreneurial process (Santamaria, 2022), which can even help the wider ecosystem in terms of lower societal cost (Saridakis, Frankish and Storey, 2021; Khelil, 2016) of a delayed exit.

Chapter 3 focuses on the relationship between the founder's human capital and age on the duration of the founder's exit (i.e. disengagement from the entrepreneurial process), which is a critical part of the entrepreneurial process (Rouse, 2016). This chapter adopts a human capital theoretical perspective together with a classic model of passive learning in entrepreneurship (i.e. Jovanovic's model, 1982), in an attempt to demystify the founder's exit process duration. In addition to the direct effect of human capital factors, I have also empirically tested the interaction effect for the general and specific human capital to better understand the dynamics of a founder's exit, which will also help in better understanding the entrepreneurial exit based on any complementarities among different types of human capital. Such understanding will also help to appreciate the relationship between the founder's human capital and the founder's exit as different individual characteristics are required for entrepreneurial exit and new venture creation (Lee and Lee, 2015). The effect of a founder's human capital on exit decisions has also remained difficult to establish because of the potential trade-off between the founder's human capital and performance threshold (Lee and Lee, 2015). This chapter will therefore help in developing a better understanding of the founder's disengagement from the entrepreneurial process because most of the empirical research has been on the firm level (DeTienne and Wennberg, 2016). Individual-level exit studies are important because exit decision is one of the most crucial decisions founders make (Shahid and Kundi, 2021), and what help them to make efficient decisions, lacks both theory and measures for entrepreneurial process outcomes for these individuals (Strese *et al.*, 2018). Moreover, these individual-level exit decisions have consequences for individuals as well as for the economy at large (Morris, Soleimanof and White, 2020).

Furthermore, the 'more is better' assumption, which is simply aggregating different types of individuals' human capital (e.g. education and experiences) (Ployhart and Moliterno, 2011), has left out studying interaction effects and possible complementarities or trade-offs between

founders' general and specific human capital factors in respect to the venture outcome. Therefore suggestions have been made to investigate the combined effect of different human capital factors (Ratzinger *et al.*, 2018), and in chapter 3, I am empirically testing both the direct and interaction effect of a founder's human capital on a founder's exit. There are two key reasons behind this enquiry.

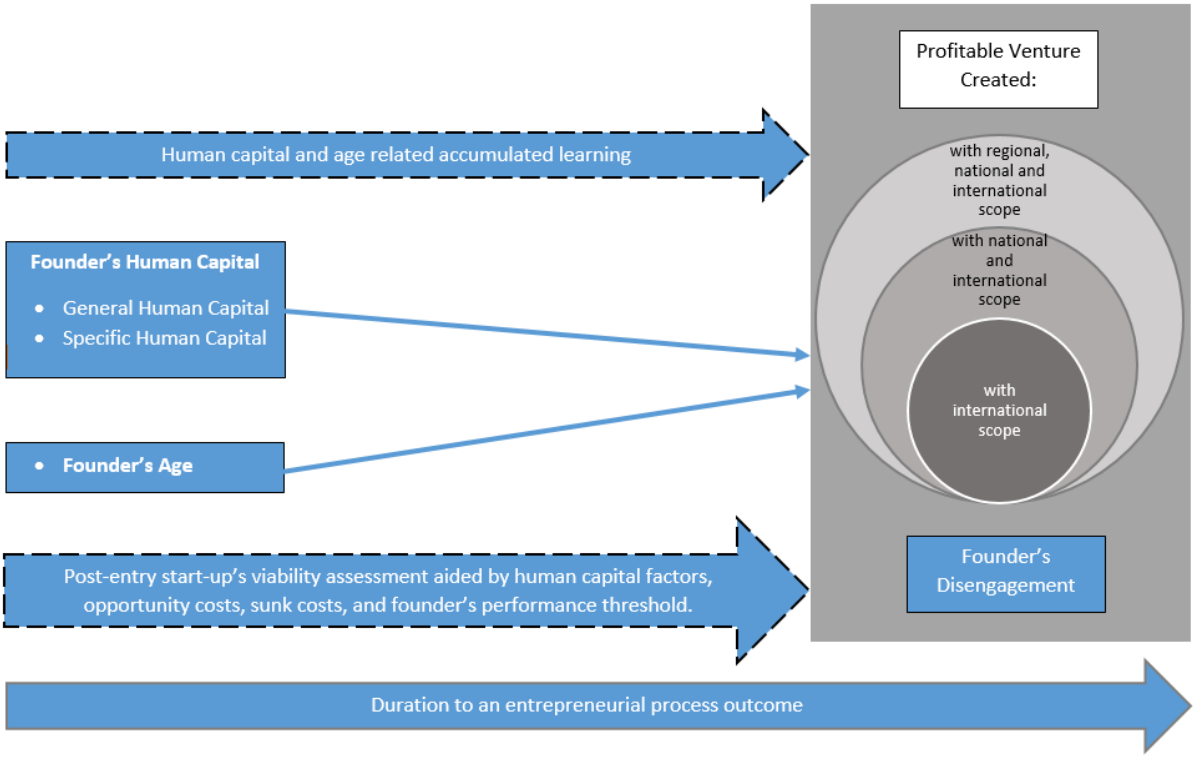
Research on the type of human capital and founder's exit has also remained divided. Some have found that the general human capital contributes toward the exit (Grilli, 2010), and some have found that lower general and specific human capital is less likely to make the founder exit as they may not have many alternate options available (Rauch and Rijsdijk, 2013), and some linking both general and specific human capital to survival (Cauchie and Vaillant, 2016), hence lower possibilities of an exit. Lower human capital (e.g. work and industry experience) has been associated with the founder's voluntary exit (disengagement) earlier into the venture creation process, due to opting for alternative employment opportunities as well as exiting due to lower market response (Parastuty *et al.*, 2016). On the contrary, Toft-Kehler, Wennberg and Kim (2016a) have suggested that both novice and highly experienced founders are more likely to continue with their venture creation process, hence suggesting would not exit early. In this chapter, have therefore attempted to clarify the role founder's human capital play in the likelihood and duration to exit.

For instance, a founder's higher educational attainment is linked to better employment prospects and even if these individuals enter the process they may see entrepreneurial pursuit as a temporary and convenient option and are less likely to see business ownership as a convenient and temporary option than individuals with lower educational qualifications, which can than impact the duration to the founder's exit (Saridakis, Frankish and Storey, 2021). I have therefore empirically tested the categorical educational measures to help establish the true relationship between different levels of educational qualifications and the likelihood and duration of the founder's exit. Similarly, research has found specific human capital to be linked to the founder's exit (Guerrero and Espinoza-Benavides, 2021).

Nascent entrepreneur disengagement based on the degree of learning has also been considered an intelligent exit (strategic disengagement) based on an efficient assessment of the likelihood of a new venture being created (Camuffo et al., 2020; Yusuf, 2012). Therefore, an insight into founders' human capital and the duration to their exit decision would advance entrepreneurial exit research. My key contribution to entrepreneurial exit research through this chapter is that I have empirically tested general-specific human capital interactions to show how founders with higher human capital tend to benefit from applying their learning which has

a significant and positive effect on the likelihood of disengagement from the process. The complementarity effects of the founder's human capital factors enhance their transferability of knowledge skills and learning, hence delaying the likelihood of an exit. Moreover, from the smart/intelligent exit perspective, it is clear that though the founders have that option by they tend to continue to benefit from their human capital in terms of progressing through the entrepreneurial process and navigating thorough any challenges, hence delaying the possibility of an earlier voluntary exit. Figure 1.3 below illustrates the conceptual framework for this chapter.

Figure 1.3 Chapter 3 in relation to the conceptual framework



1.6.3 Chapter 4

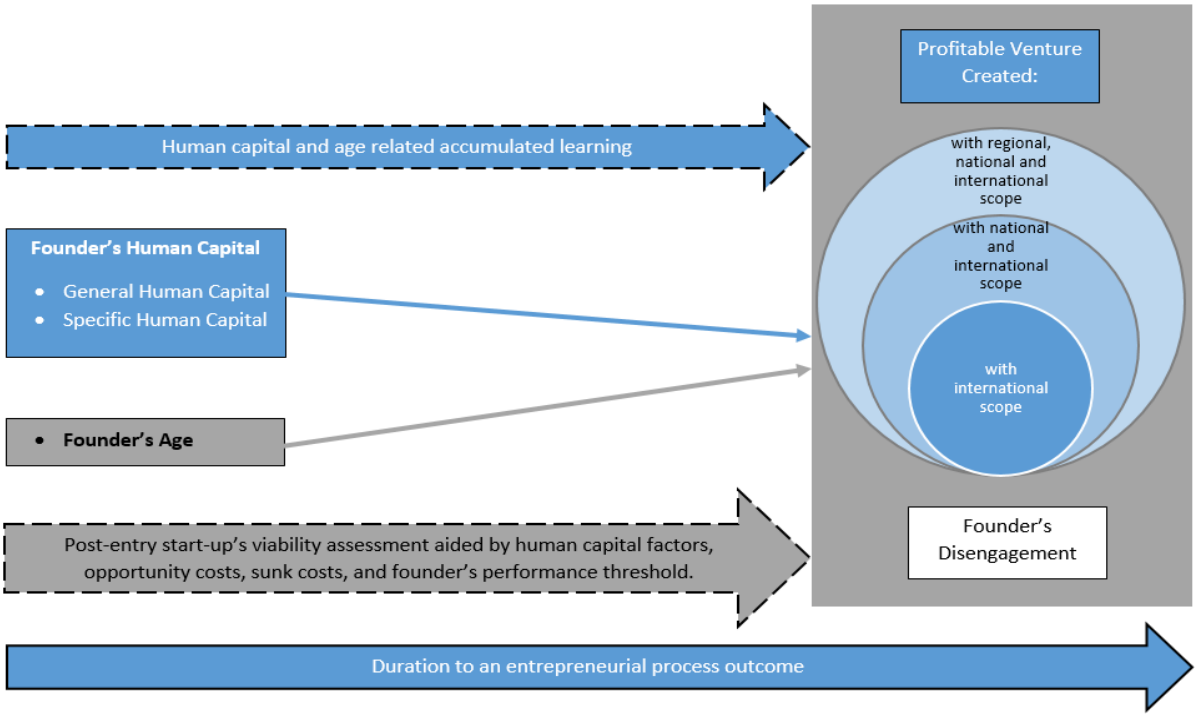
Chapter 4 undertakes a study into the spatial scope of sales and the founder's human capital factors. This involves nested model formulation on three-level: regional, national and international; national and above; and international. The chapter has attempted to go beyond the typical dichotomy of national-international entrepreneurship and has also focused on far less researched nascent entrepreneurship level as compared to the most common firm (i.e. born global, international new venture, multinational enterprises - MNEs) level studies in the international business and international entrepreneurship studies. It is important because the entrepreneurial behaviour process happens over time (Chandra, 2017; Liesch, Welch and

Buckley, 2011) and both the timing and spatial scope strategy may also differ based on the founder's human capital based knowledge and skills, and decision-making skills (Liesch, Welch and Buckley, 2011). Moreover, I am concerned with the width/level of spatial scope of sales that have been largely seeming with either the internationalisation lens or regional lens, and the duration to a profitable venture creation aided by the founder's human capital. Similarly, studying individual-level factors and speed of the entire internationalisation process, not just activities within, has been highlighted (Vlačić *et al.*, 2022), and therefore this chapter would be ideally placed to address these gaps in the literature and help to theorise beyond the speed to internationalisation and/or born global only focus. This is important because the different spatial scope would mean a different level of the liability of foreignness, resource requirements, and different pace and performance requirements (Blesa and Ripollés, 2021). The chapter brings together findings on the founder's human capital factors and the duration to a profitable venture creation in different spatial scopes of sales.

Spatial scope, defined as expanding across different geographical markets, has not been sufficiently analysed in international entrepreneurship studies (Ismail and Kuivalainen, 2015). It is important to study because founders can be exposed to potential inter-temporal learning through gradual expansion of the spatial scope, and can have a different perception of the sunk costs, and performance thresholds of learning (Braunerhjelm and Halldin, 2019). All of this can impact not only their likelihood of establishing a profitable new venture in different (narrower/wider) spatial scope but also the duration of the process, based on the tactical knowledge gained from the founders' human capital (Øyna and Alon, 2018). Moreover, a wider spatial scope could potentially benefit the new venture creation process in terms of diversity and better access to the customer base, reducing the pressure of the domestic competition (Crick and Crick, 2021), which may lead to better prospects of launching a profitable new venture in shorter duration. In this chapter, I have therefore expanded the research scope to different spatial scopes of sales and addressed the need to study potential (from a human capital perspective), pace (duration), and performance (profitable outcome) in terms of start-up spatial scope (Blesa and Ripollés, 2021) from the founder's human capital perspective. This is relevant to the level of enquiry because human capital provides individuals with tactical knowledge, which can provide a strategic advantage to the early growth of spatial scope (Øyna and Alon, 2018). In this chapter, by studying both general and specific human capital factors on different spatial scopes of sales, I will also be able to provide clarity on if 'jack-of-all-trades' view (i.e. founders with a more balanced skill set) (Syme and Mueller, 2022) are more likely to create a profitable new venture in shorter duration in different spatial scope, or not. I have provided an insight into how different types of human capital play their role (i.e. transferability of those human capital factors) in terms of profitable venture creation in shorter duration at

different levels of the spatial scope of sales (i.e. regional, national and international, national and above, and international). By focusing on how the spatial scope of sales and profitability are affected by the founder's human capital, I have expanded my research beyond just international scope and have provided a fresh theoretical perspective on nascent entrepreneurs' pre-entry human capital factors and the likelihood of an early profitable new venture launch at different spatial scope of sales. Moreover, I have contributed by shifting focus from just the contextual factors and have introduced founder's human capital perspective and resulting capabilities that help them to better reflect on dynamic circumstances of venture creation and act effectively while have a wider spatial scope of sales. This has helped in a better understanding of human capital investments in terms of higher skills contributing to better knowledge acquisition, openness to new ideas, and higher productivity (Mason, Rincon-Aznar and Venturini, 2020; Ramos-Hidalgo, Edeh and Acedo, 2022) at different spatial scopes of sales. Figure 1.4 below illustrates the conceptual framework for this chapter.

Figure 1.4 Chapter 4 in relation to the conceptual framework



1.7 Looking Ahead

Two main themes emerge from the three empirical chapters: Firstly, as stressed earlier, the importance of studying entrepreneurial process duration, which varies for different types of

entrepreneurial process outcomes. From a shorter duration to profitable new venture creation, higher human capital levels tend to contribute positively. However, when it comes to the founder's disengagement decision in a shorter period of time, prior start-up experience doesn't help unless accompanied by the founder's general human capital (i.e. interaction with higher education and prior work experience). Old age not only contributes to a shorter duration to a profitable outcome, backed by accumulated knowledge, experience, and networks but also delays the founder's exit possibilities due to them being more realistic with their expectations and having fewer external employment opportunities. Secondly, different human capital factors and their levels (including factors within general and specific human capital) impact venture outcome and duration differently and even the level of impact travel differently when moving across different spatial scopes of sales. The national and above spatial scope of sales tends to benefit less from the founder's human capital levels as compared to regional, national and international, and international scope, in terms of shorter duration to a profitable outcome. Higher educational attainment has been found transferable to all spatial scopes of sales in terms of the shorter duration to profit. However, prior start-up experience only contributes towards accelerated speed to a profitable outcome in the case of international scope. This shows that in terms of rapid internationalisation, start-up-specific experience and knowledge, customer engagement and acquisition skills play an important part.

Crane *et al.* (2016) argued that a theory should have the potential to explain a phenomenon and theoretical contribution should highlight how the theory enhances our understanding and explain the phenomenon compared to previous understanding. I believe that appreciating the importance of founders' human capital on both the entrepreneurial process outcome and duration can lead us to develop better theories. In my thesis, I have shown how different human capital factors influence the duration to profitable venture creation and the duration to a founder's disengagement differently, due to a dual mechanism at play. First, the human capital theory and that not 'more is better' apply to all three aspects equally (i.e. profitable outcome, exit, and spatial scope of sales), pointing toward the transferability of those human capital factors from a duration perspective (i.e. how quickly and efficiently can be transferred). Second, it is only after founders enter the process, is when they learn about the endowment of entrepreneurial talent (Stam, Audretsch and Meijaard, 2009; Jovanovic, 1982), in terms of the context (i.e. hi-tech/non-hi-tech and spatial scope of sales). This, in turn, will lead to the development of policies that are better targeted to the demographics and the context of an economy, and can also be of use for a better assessment at the individual level before they embark on their entrepreneurial journey in terms of better duration expectations. Moreover, the findings of my research can be useful for institutions like accelerators and incubators in

better pre-screening of entrepreneurs into their programmes and in providing effective support mechanisms based on the human capital assessment and the expected venture creation.

Chapter 2: A Timely Take-off: Human Capital and Entrepreneurial Process Duration

Abstract

This study examines the impact of nascent entrepreneurs' human capital, both general and specific human capital, and their age, on the duration of the business start-up process until a positive (profitable) outcome. The human capital theory proposes that knowledge and experience improve individuals' productivity and therefore individuals with higher human capital should have greater ability in terms of achieving a profitable outcome of the entrepreneurial process in a shorter duration of time. Using two US cohorts from the harmonised PSED dataset, the study finds that higher educational attainment, prior start-up experience, and industry experience facilitate shorter duration until a profitable outcome. The study further demonstrates how being a hi-tech start-up benefits from a nascent entrepreneur's higher educational attainment in terms of shorter duration until the profitable outcome of the start-up process, and concludes that there is scope for integrating the duration perspective into how human capital impacts a profitable outcome for start-up initiatives and proposes a theoretical framework based on the human capital theory for effecting this integration. Age has a non-linear relationship with the speed of profitable venture creation. Research limitations and implications from the findings are also discussed.

Keywords: Panel Study of Entrepreneurial Dynamics (PSED), Entrepreneurial process, Human Capital, Duration study

2.1 Introduction

An individual's human capital is believed to be crucial for a start-up's survival and success as it helps entrepreneurs in making key decisions without any expert resources at hand (Yi and Xu, 2019). Time is an important dimension of the entrepreneurial process (Hechavarria, Li and Reynolds, 2017; Bird and West, 1997) and the study of venture creation speed is a subset of time and entrepreneurship research (Stayton and Mangematin, 2016). However, temporality has remained a less focused area in entrepreneurial empirical studies, resulting in its lack of integration of entrepreneurship theory (i.e. theorised relationship between individuals and entrepreneurial opportunities) (Wadhwani *et al.*, 2020). One possible reason for a lack of attempt made on this front could be because 'time', in the past, had been considered as introducing noise in variance-oriented designs, or as irrelevant because studying entrepreneurship as an act rather than a process that emerges over time (McMullen and Dimov, 2013). Now it's time that entrepreneurship studies started borrowing analytical tools to study timing, duration, transitions, and consequence, like other fields of studies e.g. labour economics and organisational change (Burton, Sørensen and Dobrev, 2016), and use longitudinal methods to study entrepreneurial process duration and outcomes (McMullen and Dimov, 2013).

Time is believed to be a strategic but scarce exchangeable resource that can be used as money in the economic marketplace to attain start-up strategic objectives (Das, 2019). Lévesque and Stephan (2020) have also argued that further advancements in entrepreneurial research can be made by moving away from the static view of entrepreneurship, and by incorporating time-based process research at the individual (entrepreneur) level, which could highlight any competitive advantage e.g. in terms of industry differences. Moving away from the static view would also improve understanding of the entrepreneur's ability to build strategic foresight to gain competitive advantage (Peterson and Wu, 2021) and clarity on the duration-performance (outcome) aspect of the entrepreneurial process. I believe that bringing the duration perspective to entrepreneurial process research is important because the entrepreneurial process is time-variant (Leong, 2021), and optimising market opportunities while they are available means that the aspect duration involved in new venture creation (Tang *et al.*, 2021). Moreover, studying the impact of a founder's human capital on entrepreneurial process duration would provide realistic duration expectations for new venture creation. This is important because miscalculations can result in cash flow problems, missing product/service-to-market deadlines, and not meeting customers'/market expectations (Peterson and Wu, 2021), which can impact venture outcomes.

The entrepreneurial process is inconstant in duration (Davidsson and Gruenhagen, 2021), which can span from a few months to over 10 years (Reynolds, 2016). Entrepreneurs tend to have more swift responses to their time, and if their expectations are not met, they may opt for alternate options (Bi, Boh and Christopoulos, 2021), which would mean a direct impact on the entrepreneurial process outcome. Entrepreneurial process duration studies can therefore help in assessing the speed of the entrepreneurial process to possible outcomes, including the creation of a successful new venture (Davidsson and Gruenhagen, 2021). Moreover, the time that nascent entrepreneurs take for new venture creation is an important performance criterion because it can help reduce societal costs associated with start-up efforts (Hechavarria, Li and Reynolds, 2017), particularly when founders drag on for too long while pursuing a venture creation. Such costs could also include tensions with family members because of the obsessions with start-up creation (Wright and Zahra, 2011), individuals' wellbeing, limited liability (i.e. due to institutional mechanism) for any adverse outcome (Dew and Sarasvathy, 2007), founder's resources being deployed inefficiently (Zahra, Newey and Li, 2014), and creating unsafe work environments that would eventually cost the society as a whole (Zahra and Wright, 2016).

Entrepreneurs are interested in and motivated by successful start-up duration because, by reducing the time and financial investment, they can gain a competitive advantage over their competitors (Stayton and Mangematin, 2016). Time advantage can also be the differentiating factor for new ventures in terms of creating stronger relationships with their supply chain and potential customers, by being able to respond to their needs in a shorter duration (Capocchi, 2019). The trade-off between quicker, but sometimes risky, actions versus slower but more accurate actions has not received much attention in entrepreneurial research (Lerner *et al.*, 2017). Hence, understanding the trade-off between the benefits and cost of speeding through the venture creation process can help entrepreneurs efficiently quantify the expected returns from being fast and can lead to better decisions (Pacheco-De-Almeida, Hawk and Yeung, 2015). In this chapter, I will, therefore, explicitly focus on time duration within the entrepreneurial process until a successful venture creation, considering the role of the human capital of nascent entrepreneurs, and using longitudinal research to reveal causal relationships between human capital and time duration to successful venture creation.

Human capital has been empirically and theoretically linked to a firm's performance (Backman and Karlsson, 2020; Baptista, Karaoz and Mendonca, 2014; Rauch and Rijsdijk, 2013; Gary S . Becker, 1962). Human capital variables are believed to affect the tendency of nascent entrepreneurs to engage in the entrepreneurial process (Parker, 2018a), however,

entrepreneurial research on human capital and entrepreneurial activity relationship has either not consistently produced strong results, or has reported conflicting findings (Davidsson and Honig, 2003). Moreover, it has been argued that individuals' age, as a proxy for human capital, should be considered in the context of start-up initiatives (Castell´o-Climent, 2019). This is particularly important because inadequate theoretical attention to an entrepreneur's age, often treated as a control variable, has not helped to empirically establish how older and younger entrepreneurs differ in terms of entrepreneurial success (Zhao *et al.*, 2021). Research has also produced contradictory perspectives on the potential role of age in entrepreneurial outcomes due to other factors, including an individual's human capital (DeTienne and Cardon, 2012). The paucity of empirical research on the impact of individual human capital variables on possible start-up outcomes requires attention (Lee, 2019). This human capital and entrepreneurial process-based empirical study, drawing upon human capital theory (Becker, 1964), will therefore be unique to not only introduce both general and specific human capital elements but also introduce age structure into the modelling of the duration of a profitable outcome.

It is important to study individual-level nascent entrepreneurs' factors because they can provide better insight into those factors that help individuals to act entrepreneurially than others (Lanivich, Lyons and Wheeler, 2021). A longitudinal study by Blumberg and Pfann (2016) focused on the start-up duration for individuals, born in 1939/1940, but the key focus was on individuals' family business (social capital) background. In this chapter, I have focused on finding the direct impact of a founder's human capital and entrepreneurial process duration on a profitable outcome (venture performance), which is important because higher human capital has been found to increase productivity levels and innovation (Andretta, Brunetti and Rosso, 2021). A time-based entrepreneurship study by Yli-renko, Denoo and Janakiraman (2020) focused on the survival and growth outcomes of young firms based on their dependence on key customers, but again the focus was on firm-level and the only specific human capital studied was the team's prior industry experience. My study would therefore provide a much richer (i.e. both general and specific human capital factors) insight into the nascent start-up activity and, more importantly, the measure of success (outcome) is much clear and more observable (i.e. a profitable venture created). Moreover, this chapter will provide better insight into nascent entrepreneur's human capital contribution not only in terms of a positive outcome but also from the duration perspective. This is important because time matters at the individual entrepreneur level (Lévesque and Stephan, 2020) as speeding up the entrepreneurial process through earlier wins (e.g. new product development) also help founders to establish legitimacy, generate critical cash flow (Schoonhoven, Eisenhardt and

Lyman, 1990; Stayton and Mangematin, 2019), and avoid the risk of running out of time (Stayton and Mangematin, 2019).

Human capital has also been linked to the success of technology start-ups particularly when their projects (R&D) are relatively high-risk and can impact (delay) future revenue streams (Baum and Silverman, 2004). High-tech start-ups involve scientific activities that can benefit from the founder's educational (i.e. general human capital) background (Antoniuk *et al.*, 2017), and their educational background can also benefit them with establishing important networks, including access to funding (Di Paola *et al.*, 2018). This would mean there would be human capital and duration-related efficiencies for hi-tech start-ups, and therefore, it has been argued that entrepreneurship research can become more transparent by studying the context in terms of the time and individuals' characteristics (Anderson, Wennberg and Mcmullen, 2019) and despite considerable quantitative empirical studies, but still ambiguity exists on how and why entrepreneurial process outcomes differ among the hi-tech and non-hi-tech ventures (Shim and Davidsson, 2018). The time between conceiving a new venture creation idea and venture creation outcome (i.e. new venture creation or discontinuation of the start-up process) differs among entrepreneurs even within the same industry (Hechavarría, Matthews and Reynolds, 2016), therefore, this study will also look into the interaction effects of educational attainment and venture type (i.e. hi-tech/non-hi-tech) to help in identifying optimal combinations of the factors under study. Capelleras *et al.* (2010) attempted to establish a relationship between human capital and venture creation speed but did not account for the general human capital (educational attainment), industry type (hi-tech/non-hi-tech), and speed to a profitable outcome. It is important because, for instance, hi-tech ventures have better survival rates than other conventional ventures, benefitting from education and university-based research (Parker, 2018a). Stayton and Mangematin (2019) presented a mechanism for speeding up start-ups, but not from duration to success (being profitable) perspective, and only focused on the organisational level (e.g. accelerators) contributions to technology start-ups. Focus on individual-level factors is important, which this chapter has attempted because the founders' human capital capabilities are considered strong enough to launch a successful new venture (Debrulle *et al.*, 2020; Razmdoost, Alinaghian and Linder, 2020). This chapter empirically tests both the real impact of human capital factors as well as the interaction effect of hi-tech with education, being one of the key factors behind hi-tech ventures' success. By doing so I will attempt to fill the gap in process-based studies that have predominately remained focused on start-up activities rather than an observable entrepreneurial process outcome in the form of a profitable new venture created and its duration (McMullen and Dimov, 2013). I will therefore provide a better insight into rather inconclusive research on the founder's human capital in terms of how the founder's pre-entry general and specific human capital can impact the

likelihood of profitable venture creation and the duration to that observable outcome (Criaco *et al.*, 2014).

This chapter's research question is what effect a founder's human capital and age have on the nascent entrepreneur's duration to profitable venture creation and if higher educational attainment amplifies the profitability impact on the duration for high-tech start-ups. This time-conscious study has four contributions to the entrepreneurial process-related literature and empirical research. Firstly, this study takes a dynamic view of entrepreneurship whereby human capital and duration to profitable outcome was empirically studied over time (Lévesque and Stephan, 2020) by detangling founder-level general and specific human capital to better understand the nascent entrepreneurial dynamics from duration and profitable outcome perspective. By using the human capital constructs, I have provided theoretical insights into their relationship to the duration of profitable venture creation, and have extended the human capital theory (Becker, 1964) to also predict duration gains (speed to profitability) by individuals with higher human capital. Additionally, as the human capital theory focuses on individual factors (Sun and Fong, 2021), I have empirically shown which human capital factors are more conducive to profitable venture creation in a shorter period. Therefore, this study will feed well into the research priority among academics and practitioners to enhance their ability to predict venture outcomes (Rauch and Rijsdijk, 2013).

Secondly, in this chapter, I have accounted for another possible outcome (i.e. exiting entrepreneurial process) of the entrepreneurial process and have produced a detailed analysis of the duration to a profitable start-up, which is a new scholarship in terms of adding sophistication to the entrepreneurial process-based studies. I have done so by using competing risk models, in addition to the classical time-to-event model (i.e. Cox), to avoid biased results due to using models that do not incorporate the option of multiple outcomes (Karunarathna and Sooriyarachchi, 2017). This is important because a founder can also voluntarily exit the entrepreneurial process (Shepherd and Patzelt, 2021b) and therefore need to account for the competing risks while studying the duration to a profitable venture outcome. The competing risk modelling has also enabled me to account for/incorporate the neoclassical economics approach, whereby individuals are free to enter and exit the market.

Thirdly, this study sheds light on early-stage ventures' dynamics of hi-tech versus others, which have long remained economists' concern, in measuring start-ups' potentiality (Zhang, Zhuge and Freeman, 2020). By studying the interplay between human capital and the entrepreneurial process duration for hi-tech ventures, and how human capital under competing risk impacts the profitable start-up duration of hi-tech initiatives, this study will

present significant theoretical implications in terms of validating the predictive power of human capital theory and providing crucial understanding on how hi-tech and non-hi-tech nascent start-ups benefit differently from human capital for the duration until a profitable outcome.

Finally, as many past entrepreneurial studies have focused on entrepreneurial outcome (Huang, 2016) but not the duration to a profitable outcome, I have purposed a criterion for entrepreneurs' duration to a successful venture creation in the context of human capital, which has advanced our understanding of the nascent entrepreneurship phenomenon, both from the individual perspective, who then wish to enter the process, as well as the policymakers, to better understand new ventures' prospects based on founder's human capital and from efficient support mechanism (Lévesque and Stephan, 2020).

2.2 Literature review, theory and hypothesis development

Entrepreneurship is a career option (Markin et al., 2017; Emontspool and Servais, 2017) and has been described as a voyage that usually involves both gains and losses while an entrepreneur utilises his/her abilities to overcome start-up challenges throughout the entrepreneurial process (Kwapisz, 2019). Given that an individual's abilities may influence different venture outcomes (Hopp and Greene, 2018; Zapkau, Schwens and Kabst, 2017) and that entrepreneurs do not create successful ventures within the same timeframe, understanding how the entrepreneurial process duration to a profitable outcome, conditioned by the entrepreneur's human capital, becomes the focus of this study. This is important because founders' human capital investment into new venture creation is an intertemporal choice they make with an expectation of a future payoff (Flabbi and Gatti, 2018), therefore, the duration of a profitable venture creation would matter to them. Moreover, discerning the duration to a profitable outcome is important (Shim and Davidsson, 2018) because of the differences in founders' human capital and their opportunity costs (e.g. income forgone while pursuing a start-up opportunity), which may accelerate or decelerate the entrepreneurial process (Davidsson and Gruenhagen, 2021). Knowing the duration of a nascent venture process outcome is even more important because a shorter time would mean reduced sunk costs associated with the start-up process and a better estimation of the return on time and money investment (Reynolds, 2018). Research has suggested that nascent entrepreneur's background or characteristics can impact the new venture creation process (Mergemeier, Moser and Flatten, 2018) and that entrepreneurial outcome are partly linked to entrepreneurs' capability to identify potentially rewarding opportunities (Shane and Venkataraman, 2000; Shepherd and Detienne, 2005). It has also been suggested that different aspects of human

capital (e.g. education and experience) lead to different entrepreneurial process outcomes (Rauch and Rijsdijk, 2013).

Human Capital

A wide range of definitions exist on what constitutes human capital with some considering it as an individual's stock of skills (Vassilev, 2018; Goldin, 2016); a collection of an individual's knowledge, experience, abilities, skills, intelligence, reliability, and judgement (Rosenberg, 2018); and individual's ability, knowledge and competence (Keeley, 2007b). The concept of human capital can at least be traced back to Adam Smith (1776) in The Wealth of Nations, where an individual's talent acquisition was categorised as "a capital fixed and realized, as it were, in his person" (Burton-Jones and Spender, 2011). Two centuries later, Becker (1964) introduced the human capital theory, which defined human capital as the set of skills and knowledge acquired by individuals through their investment in schooling, on-the-job training, and other types of experiences.

The human capital theory has been widely and increasingly used in entrepreneurship studies to argue how human capital should contribute to the entrepreneurial success (Unger *et al.*, 2011; Becker 1964; Schultz, 1980). The human capital theory predicts that individuals expect a return on their investments in human capital and hence will try to maximise the economic benefit over their lifetime when applied to entrepreneurship. This reflects that entrepreneurs with higher human capital must receive appropriate benefits from start-up activities (Rauch and Rijsdijk, 2013). Koster and Andersson (2018) have argued that entrepreneurial success depends on the human capital resource available to the entrepreneur and it is therefore not surprising why attempts have been made to apply human capital theory to entrepreneurship research (Samuelsson and Davidsson, 2009; Davidsson and Honig, 2003; Gimeno *et al.*, 1997). Human capital factors affect the entrepreneurs' tendency to engage in the entrepreneurial process (Parker, 2018a) and can impact the new venture creation process (Mergemeier, Moser and Flatten, 2018), suggesting factors like education, industry experience, and start-up experience can enable them to make key decisions without expert resources at hand (Yi and Xu, 2019).

General human capital consists of educational attainment and work experience, whereas specific human capital consists of entrepreneurial experience and industry experience (Canavati *et al.*, 2021a; Bergmann, 2017; Dimov and Shepherd, 2005). General human capital (education and work experience) is not job-specific and therefore transferable to other settings. Specific human capital (industry experience and prior start-up experience) is context-

specific and therefore considered less transferable to other contexts (Rauch and Rijsdijk, 2013).

Higher education is the main source of general human capital accumulation (Estrin, Mickiewicz and Stephan, 2016; Unger *et al.*, 2011) as it facilitates identifying entrepreneurial opportunities and optimising the use of and returns from other resources (Praag, Witteloostuijn and Sluis, 2013). Moreover, educational attainment level is believed to drive an increased venture creation action in the case of innovative start-ups (Samuelsson and Davidsson, 2009) as educational experience provides founders with better commercial and technical insight (Binnui and Cowling, 2016), and social integration and legitimacy that helps to reduce the liability of newness (Di Paola *et al.*, 2018). The impact of education during the entrepreneurial process has been empirically supported (Gordon and Davidsson, 2013) and it has been argued that as general human capital can be applied in different contexts, it can therefore contribute to any venture's success (Rauch and Rijsdijk, 2013). In contrast to educational attainment, general work experience though may encourage entrepreneurship when the opportunity pursued is related to the individual's occupation (Parker, 2018a), however, prior work experience has not been found significant in business start-up (Rasmussen and Wright, 2015; Wennberg, Wiklund and Wright, 2011). An Individual's prior work experience has been associated with the probability of survival (Watson, Hogarth-Scott and Wilson, 1998) but not profitability or a profitable outcome, hence studies focused on profitable outcome have only used work experience as a control (Manso, 2016). Moreover, research has found that work experience does not matter when explaining the profitable venture outcome (Kyndt and Baert, 2015; Davidsson and Gordon, 2009; Kim, Aldrich and Keister, 2006; Evans and Leighton, 1990). Given the focus of this chapter on the duration to a profitable venture outcome, I have therefore only included educational attainment in the independent variables and I have controlled for the prior work experience.

Specific human capital includes industry-specific experience and prior self-employment experience (Dimov, 2017; Unger *et al.*, 2011), which provides individuals with the knowledge and skills that are needed in launching a new venture (Rauch and Rijsdijk, 2013). Prior leadership experience and having self-employed parents have also been considered specific human capital factors (Brüderl, Preisendörfer and Ziegler, 1992). However, most of the empirical research (Dimov, 2017; Unger *et al.*, 2011) on nascent entrepreneurship has used prior start-up experience and prior industry experience as the measure for founders' specific human capital and I will be using these same measures which are also part of the PSED studies (Reynolds, 2018). Prior start-up experience is also believed to play a key role in effective opportunity discovery benefitting from prior knowledge (Matthew R Marvel, 2013)

and complementary skills gained by prior exposure (Reynolds, 2018). Nascent entrepreneurs with greater industry experience are more likely to continue their start-ups (Dimov, 2010). Moreover, industry-specific experience provides knowledge about profitable opportunities and helps founders in the better organisation of ventures (Rauch and Rijsdijk, 2013).

In addition to the general and specific human capital, it has been argued that human capital comprises varied other components (e.g. knowledge, general experience, and health), which accumulates as an individual ages (Ciutiene and Railaite, 2015; Wennberg *et al.*, 2010) and given that entrepreneurial ambitions also require a certain level of energy and effective business decision making, research on how entrepreneurship rates vary by age and over time, has also been pursued (Liang, Wang and Lazear, 2018). Empirical research has also included the entrepreneur's age in the general human capital domain in addition to the educational attainment and prior work experience (Ughetto, 2016). Research by Krieger *et al.* (2021) have also found that individuals accumulate skills as they age that can help them in growing their competencies. Zhao *et al.* (2021) have therefore argued that an entrepreneur's age deserves more scholarly attention and rather than including an entrepreneur's age as a control variable, a study on the complex relationship between an individual's age and venture outcome (success) would certainly benefit from studying its direct effect.

Davidsson (2012) while operationalising general human capital included age as well and found general human capital to be most effective when individuals are at their prime age (i.e. accounted for the curvilinear effect of age). Although it has been suggested that human capital is an age-related mechanism that could help in understanding the age-success relationship (Zhao *et al.*, 2021), age has also been considered as a demographic, individual characteristic (Shook, Priem and Mcgee, 2003) that affect emotional intelligence development (FakhrEldin, 2017), enhance their ability to access information, efficiently allocate available resources, and contribute to new venture success (Fatma *et al.*, 2021). Research on age, as a personal characteristic, also suggests that the venture creation process outcome would also depend on how the age factor determines the individual assessment of opportunity costs, risk-taking behaviour, and age-based image of entrepreneurship (Lin and Wang, 2019). Given that age has its effects, distinct from the human capital contribution, I would therefore be treating it separately to study the duration to a profitable outcome and not as a proxy for human capital.

Human capital has also been considered to play a key role in innovation, however, its impact on innovation remains unclear due to the lack of evidence on the impact of pre-existing human capital and how persistent is that effect on entrepreneurship (Diebolt and Hippe,

2019). It is believed that human capital advantage can impact the likelihood of early profitable start-up creation, both for the hi-tech and non-hi-tech start-ups, but high-tech start-ups are believed to have even better survival rates when stemming from an individual's investment in basic education and skill (Parker, 2018a).

Human Capital and Entrepreneurial Process

Entrepreneurial process duration can vary among individuals because of their characteristics and context (Ye, 2017) as individuals with greater general and specific human capital are relatively better placed to benefit from both opportunity discovery and opportunity creation (Ucbasaran, Westhead and Wright, 2008). In process-based studies, the focus on human capital contribution has largely remained limited due to concentrating on start-up activities (milestones) rather than entrepreneurial process outcomes (McMullen and Dimov, 2013) that include ventures being created or process exited. Research on the human capital impact on entrepreneurial process outcomes has also remained inconclusive and leaves a gap for studying relationships in evaluating human capital factors and venture outcomes (Criaco *et al.*, 2014). Hogendoorn *et al.* (2019) found that formal education only has a positive effect on a venture's profit, whereas El Shoubaki, Laguir and Besten (2019) found that formal education has no impact on venture growth but it is the specific human capital (industry and start-up experience) that helps. Baum and Silverman (2004) have even argued that the human capital and entrepreneurship relationship is a bit overhyped. Huang (2016) found that from the entrepreneurial human capital (education, work experience, and start-up experience), prior start-up experience only shorten the time to entrepreneurial success but the operationalisation of the subject was subjective (performance level higher than the average of other entrepreneurs/colleagues). In my study, I have analysed how both general and specific human capital factors facilitate (in terms of duration) the successful start-up creation (a clear outcome measure i.e. profitable venture created), and provided clarity on the impact of each of the general and specific human capital factor on the shorter duration of profitable venture creation. Furthermore, I have done advanced theorisation on the entrepreneurial process by using a rich dataset (Shane, 2006) that captures time to different entrepreneurial outcomes (Gupta, Chiles and McMullen, 2016) and have provided grounds for a robust entrepreneurship theory that can explain entrepreneurial phenomena from the human capital perspective (Packard, 2017). I am therefore confident that using PSED (longitudinal) datasets provide us the opportunity to empirically test a wider set of human capital factors and their direct impact on the duration to profitable venture creation.

Education (General Human Capital)

General human capital is not context-specific and is therefore transferable (Debrulle *et al.*, 2020; Flabbi and Gatti, 2018; Rauch and Rijsdijk, 2013). Education, a key constituent of human capital (Ucbasaran, Westhead and Wright, 2008) and a visible indicator of human capital endowment (Rauch and Rijsdijk, 2013), has been widely studied in entrepreneurship research but what role does education plays in start-up success remains unclear (Linder, Lechner and Pelzel, 2020; Nielsen and Sarasvathy, 2016; Davidsson and Honig, 2003). Education has been positively associated with the probability of entering the venture creation process (Hundt and Sternberg, 2014; Parker, 2011; Block, Hoogerheide and Thurik, 2011; Davidsson and Honig, 2003; Delmar and Davidsson, 2000; Bates, 1995) and found to provide founders with knowledge-based confidence (Aparicio, Urbano and Audretsch, 2016) that help in promoting innovation (Rodrigues Brás and Soukiazis, 2019). It has also been argued that higher educational attainment could help develop problem-solving skills among entrepreneurs, resulting in efficient decision-making (Baptista, Karaoz and Mendonca, 2014). The founder's educational attainment has been found positively related to the start-up's survival and growth as education provides the required knowledge base and key skills including analytical and problem-solving skills that are considered important in entrepreneurial endeavours (Watson, Stewart and Barnir, 2003). Therefore, based on better problem solving skills and efficient decision making by highly educated individuals, my tentative assumption is that founder with higher educational attainment would be quick at establishing a profitable new venture.

Education also enhances an individual's work skills and entrepreneurial abilities by enabling individuals to adjust to any consequences of changes in the economy, therefore creating the economic value of the entrepreneurial ability created via investment in education (Schultz, 1980). University experience provides individuals with the knowledge to commercialise their ideas (Wennberg, Wiklund and Wright, 2011b) as the university graduates benefit from the knowledge production via their research projects (Hayter, Lubynsky and Maroulis, 2017), therefore increasing the probability of new venture creation (Amorós and Bosma, 2013). By having better idea commercialisation knowledge, the ability to create economic value, and better adaptability to market dynamics, I would expect these founders to be quick at starting up a profitable new venture.

Highly educated entrepreneurs are also considered to be better oriented to start new ventures, benefiting from a wider network and skills that enable them to receive and evaluate new market opportunities efficiently resulting in better entrepreneurial decisions (Dileo and García Pereiro, 2019). A higher number of years spent on education is also related to

increased chances for higher earnings and better survival rates (Van Der Sluis, Praag and Vijverberg, 2008). The founders should therefore be expected to benefit from a duration perspective because of the efficiencies that they drive from their networks and better market insight.

In contrast to studies showing a positive relationship between education and entrepreneurship, entrepreneurs' qualifications are also not consistently found to have a positive impact on start-up performance (Bublitz *et al.*, 2018). Ucbasaran, Westhead and Wright (2008) have found that postgraduate degree holders when compared with compulsory school education graduates, were weakly superior with respect to an increased probability of identifying more opportunities. Fallows (1985) also suggested that more formal education negatively impacts an individual's curiosity and vision, and increases risk aversion. Similarly, Ronstadt (1984) claimed that traditional education can lead to lower risk appetite and lead individuals to conformity. Davidsson and Steffens (2010) have also argued that higher education is associated with a longer entrepreneurial process for nascent firms because these founders opt for relatively sophisticated ventures, which makes the new venture creation duration longer.

Although studies on the impact of higher qualification levels on entrepreneurial process outcomes have given mixed results (Bublitz *et al.*, 2018), still individuals with higher educational attainment tend to have a favourable assessment of new venture's growth opportunities (Capelleras *et al.*, 2019) and they choose projects with higher expected returns (Autio and Acs, 2010), which make them more profit-oriented. Bosma *et al.* (2004) also found that educated individuals make more profits from their start-ups, however, given that the research lacks consensus on whether educational background impacts a positive venture outcome or not, and hardly any study on how educational attainment levels impact start-up duration to a profitable outcome, I postulate two alternative hypotheses:

Hypothesis 1: Duration to profit for start-ups will be shorter for individuals with higher educational attainment.

Entrepreneurial Experience (Specific Human Capital)

Prior start-up experience falls under the specific human capital category (Dimov, 2017), which is believed to have productive value in a specific setting (Flabbi and Gatti, 2018) and is found to contribute to a new venture's profitability (Debrulle *et al.*, 2020). Nascent entrepreneurs with previous start-up experiences tend to be better at adapting their planning and venture approach based on the perceived environment and focus more on the upside potential of the opportunity (Markowska *et al.*, 2019), which suggests that both the likelihood of venture

creation and duration to the venture outcome would benefit from such individual behaviour and adaptation.

Prior start-up experience has also been considered to help maintain a realistic view of the challenges involved in venture growth (Capelleras *et al.*, 2019), which should help them in terms of better scoping and time management, contributing towards a shorter duration to a new venture outcome. Moreover, the founder's past negative entrepreneurial experiences help them in developing resilience (Lévesque and Stephan, 2020), which again can keep them focused on venture creation and not quitting the process. This could also be because previous successful ventures make them believe that their persistence will lead to a fruitful venture creation outcome (Audia, Locke and Smith, 2000; Detienne, Shepherd and Castro, 2008).

Individuals with prior entrepreneurial experiences can benefit from the prior knowledge, which can be effectively applied in pursuit of new venture creation (Toft-Kehler, Wennberg and Kim, 2014). Serial entrepreneurs can benefit from the skills acquired during their previous new venture creation (Dimov, 2010), which particularly benefit them in the opportunity recognition process by making decision-making easier for them (Ucbasaran, Westhead and Wright, 2008; Cassar, 2014; Mamabolo, Kerrin and Kele, 2017). Prior knowledge and entrepreneurial experiences are considered to be key factors for venture creation (Gruber, Macmillan and Thompson, 2013), which can improve entrepreneurs' information processing speed and provide them with a time advantage (Zahra and George, 2002) and explicate their performance (Mitchell, Mitchell and Mitchell, 2017).

On the contrary, it has been argued that though experienced entrepreneurs invest more time into a new venture, it still takes longer for them to launch new ventures, partly due to them being more ambitious and committed (Gordon and Davidsson, 2013). Moreover, prior venture experience may not be fully transferable to the next start-up (Samuelsson and Davidsson, 2009) as it depends on many evolving factors including how similar is the opportunity, industry, market, or product to the previous venture (Marvel, Davis and Sproul, 2016).

However, it has been argued that experienced entrepreneurs' knowledge and learning from their past ventures helps them to effectively network, which is assumed to increase prospects of new venture creation (Toft-Kehler, Wennberg and Kim, 2014). Prior start-up experience also benefits individuals with product adaptation skills and better identification of market opportunities (Honoré, 2022), which can help in establishing a profitable venture in a shorter period. Similarly, the tacit knowledge acquired through prior start-up experience facilitates

efficient decision-making under time pressure (Johannisson, Landström and Rosenberg, 1998), which should speed up the process of venture creation. Moreover, prior start-up experience prepares individuals to better cope with the liability of newness (Politis, 2008), which can assist them in better productivity of their initiatives and profitability (Soriano and Castrogiovanni, 2012). This implies that prior start-up experience should contribute both towards the higher likelihood of creating a profitable venture in a shorter period and therefore, I posit:

Hypothesis 2a: Duration to profit for start-ups will be shorter for individuals with prior entrepreneurial experience.

Industry experience (Specific Human Capital)

Entrepreneurs typically launch their businesses in the industry in which they have gathered experience (Nikiforou, Dencker and Gruber, 2019) because of the expected benefits from their pre-entry resources (i.e. industry experience) and they are also more likely to survive and grow their start-up (Helfat and Lieberman, 2002). These entrepreneurs are also more likely to focus on low-risk opportunities, because high-risk opportunities for individuals with prior industry experience are argued to reap a lower rate of returns (Dencker and Gruber, 2015), and therefore should provide them with better chances of creating a profitable new venture in a shorter period. Moreover, with prior industry experience, these individuals are better placed to efficiently leverage the entrepreneurial process (Jiao, Ling and Kellermanns, 2021), which is then expected to positively impact both profitability and shorter duration to new venture creation.

However, industry experience can lead to subjective insights into an opportunity but by itself has not been found sufficient for start-up survival, and has been associated with failure (Linder, Lechner and Pelzel, 2020). A study by Samuelsson and Davidsson (2009) found no relationship between industry experience and venturing progress because it did not contribute to innovative or imitative venture processes. Schoonhoven, Eisenhardt and Lyman (1990) also did not find prior industry experience to have any impact on the timing of venture outcome e.g. new product introduction, which suggests that prior industry experience might not be relevant for the earlier duration of venture creation.

Yet entrepreneur's industry experience may influence the venture (Giannantonio and Hurley-Hanson, 2016) as having work experience in the same industry in which a new start-up falls, can have a positive effect on the venture's success (Cooper, Gimeno-gascón and Woo, 1997). Moreover, successful entrepreneurial firms have benefitted in the short- and medium term, from the market structure and market similarity similar to their previous employer

(Jerome, 1992), which can provide them with a time advantage and make the process duration shorter. Individuals with prior industry experience have more familiarity with products and markets, which provide them with better prospects of profitability (Soriano and Castrogiovanni, 2012), and again such insights should also provide them with time duration benefits in launching new ventures. I therefore posit:

Hypothesis 2b: Duration to profit for start-ups will be shorter for individuals with prior industry experience.

Founder's Age

Founders' age has remained a neglected variable in entrepreneurship research (Gielnik, Zacher and Frese, 2012) and is mostly studied as a control variable (Kautonen *et al.*, 2015) to predict entrepreneurial success (Zhao *et al.*, 2021). However, some attempts were made to study the founder's age, both theoretically and empirically (Bau *et al.*, 2016; Kulik *et al.*, 2014; Langowitz and Minniti, 2007; Lévesque and Minniti, 2006; Ucbasaran, Wright and Westhead, 2003) but the findings on age and its impact on entrepreneurial outcome has remained divided (Startiene and Remeikiene, 2009). A possible reason for this could be that human capital differs across age groups (Prenzel and Iammarino, 2021) as age increase human capital in terms of the accumulated life experiences (Gielnik, Zacher and Wang, 2018; Huggins, Prokop and Thompson, 2017) and the factors including human capital and other aspects such as risk aversion, that are linked to entrepreneurship also tends to change during life (Lamotte and Colovic, 2013). From the human capital theory perspective, younger founders would also enjoy higher returns from human capital investments as well as have lower foregone earnings (Preisendörfer and Voss, 1990). Moreover, rather than measuring the impact of human capital indirectly through the founder's age (Preisendörfer and Voss, 1990), I have empirically tested the direct effect of age (an independent variable in my models) on the duration to profitable venture creation, and by doing so I have also minimised any common method bias (Gielnik, Zacher and Frese, 2012). This is important because age, as a general human capital, can help in predicting entrepreneurial process outcomes and a new venture's profitability (Dimov, 2010; Gimeno *et al.*, 1997; Preisendörfer and Voss, 1990).

An entrepreneur's age is considered a key predictor of entrepreneurial success (Azoulay *et al.*, 2020) and has also been considered a key determinant of survival at the individual level (Parker, 2018a). Ageing is believed to affect entrepreneurs' preferences, abilities, and productivity but its influence on the performance of individuals is not clear (Backman and Karlsson, 2020). Theoretical and empirical evidence exists on age's influence on entrepreneurship and self-employment (Kautonen, Down and Minniti, 2014; Parker, 2013), however, research on age and the likelihood of becoming an entrepreneur has remained

indecisive (Thorgren *et al.*, 2016) on the type of relationship between a founder's age and venture outcome. A positive linear relationship, using relative return to entrepreneurship rationale (Lévesque and Minniti, 2006), as well as an inverted U-shaped relationship (Kautonen et al., 2014), and a U-shaped relationship (Brieger *et al.*, 2021) has been found between age and venture start-up (Thorgren *et al.*, 2016). The relationship between age and survival (length) in the entrepreneurial journey has also been found to be curvilinear (Block and Sandner, 2009) with higher success rates among middle-aged individuals and above (Azoulay *et al.*, 2020). On the contrary, Zhao *et al.* (2021) have found a U-shaped relationship between a founder's age and entrepreneurial success, linked to a different approach to resource mobilisation and differences in success criteria based on age groups. Limited success chances for middle-aged founder is also associated with them being too focused on the element of financial security due to their family responsibilities (Brieger *et al.*, 2021). Middle-aged individuals also tend to be more economically oriented as compared to the younger and older age groups (Brieger *et al.*, 2021) and would therefore have a more conscious approach to venture creation which may also affect the venture creation duration. Zhao, Lumpkin and Wu (2015), in their initial findings, have also found a U-shaped relationship between age and entrepreneurial success**.**

Research on the effect of ageing on entrepreneurship has found individuals between 35-44 years of the age range to be more entrepreneurially active (Parker, 2018a). Some researchers have argued that entrepreneurship is positively related to age, including individuals over 50 years of age (Singh and Ronch, 2011) and some have suggested that new venture creation likelihood increases with age up to a certain point and then starts decreasing (Parker, 2009; Lévesque and Minniti, 2006). These findings signal that career preferences keep changing with age and so does the propensity for entrepreneurship among individuals as they age (Bau *et al.*, 2016). However, not much clarity exists on whether founder's who enter the entrepreneurial process create profitable new ventures quicker than individuals younger or older than them or not. In my opinion, the research would benefit more from going beyond studying the founder's age and entrepreneurial entry focus, and I am therefore empirically testing the founder's age and the duration to profitable new venture creation. Building on exiting literature on entrepreneurial entry, there could be certain age and entrepreneurial entry factors that can impact venture creation outcome and I will now discuss them below.

Age can be both an advantage and a disadvantage when it comes to entrepreneurs' evaluation of entrepreneurial opportunities based on their perception of related opportunity costs, and their risk appetite (Lin and Wang, 2019). It has been argued that the opportunity cost of time

increases with age (Lévesque and Minniti, 2006; Kautonen, Down and Minniti, 2014). Research has shown that older serial entrepreneurs take longer to start another new venture (Lin and Wang, 2019), which could be because them being more risk-averse than younger entrepreneurs (Ainsworth and Hardy, 2008; Lin and Wang, 2019; Miller, 1984). Older individuals are also considered to be more conservative with a lower ability to adopt new ideas, slow at information integration, and have lower physical and mental persistence as compared to younger individuals (Gielnik, Zacher and Frese, 2012). This suggests that they would be more likely to take longer to launch a new venture. Moreover, older individuals are more likely to have family responsibilities that can make them less likely to take risks that are necessary for firm growth (Colombo and Delmastro, 2001; Ganotakis, 2012; Zhao *et al.*, 2021), which suggest that the likelihood of early profitability would be lower.

However, the late-career changers, individuals over 50, have better self-assessment in terms of strengths and weaknesses (Greller and Simpson, 1999), and particularly near the retirement age, entrepreneurship motivation is mainly driven by the need for self-fulfilment and to remain active while ageing (Gimmon and Hantman, 2018). Moreover, ageing and negative perception of age norms can create a feeling among individuals that they are running out of time or energy to act upon entrepreneurial opportunities (Kautonen, Gelderen and Fink, 2015), which can make them create new ventures relatively quicker than younger individuals. Older founders have the benefit of higher accumulated human capital (Lee and Vouchilas, 2016), and ageing provides individuals with a broader perspective, and better social and business networks (Parker, 2018a), which can help them with making timely decisions in complex situations and hence more likelihood of profitable venture creation. Older individuals in their sixties have a better resource base and they tend to opt for less risky opportunities and which is more likely to produce a quicker income stream (Kautonen, Down and Minniti, 2014), which means that the likelihood of older individuals in creating a profitable new venture quicker would be higher.

Younger founders are likely to have better knowledge and skills gained from systematic and up-to-date training at educational institutions, which compensate for any lack of overall human capital when compared with older entrepreneurs (Zhao *et al.*, 2021). It can therefore be expected that younger entrepreneurs will speed through the entrepreneurial process successfully. Younger individuals also tend to accumulate human capital through both work experience and education (Mayer-Haug *et al.*, 2013), therefore they have higher perceived feasibility of entrepreneurship (Kautonen, Gelderen and Fink, 2015). Moreover, in the early career stage, for individuals under 40 (Bau *et al.*, 2016), a lower cost of career change is expected because of fewer resources spent on acquiring organisational or occupation-

specific human capital (Ng and Feldman, 2007), which make younger entrepreneurs more proactive (Ainsworth and Hardy, 2008) and hence they can be expected to form new venture in a shorter period.

Finally, though research has found an inverted U-shaped relationship between age and entrepreneurial entry (Bönte, Falck and Heblich, 2009; Reynolds, 2018; Thorgren *et al.*, 2016) but the research on age and the entrepreneurial outcome has remained divided. Given that older individuals would have a broader perspective, better social and business networks (Parker, 2018a), better self-assessment of their resources and capabilities (Greller and Simpson, 1999) and be driven by the need for self-fulfilment towards their end of career (Gimmon and Hantman, 2018), I would postulate that they would be in a better position to create a profitable new venture in a shorter period of time when compared to the middle-aged individuals who are keener on financial security associated with family responsibilities (Brieger *et al.*, 2021) making them to have a more conscious approach to the venture creation process that would therefore take longer.

Similarly, younger individuals also benefit from certain factors that would make them excel in creating a new profitable venture. These include them being better at thinking, abstract reasoning, and problem-solving (Zhao *et al.*, 2021), are more energetic (Liang, Wang and Lazear, 2018) with fewer family obligations (Zhao *et al.*, 2021) than middle-aged individuals (Brieger *et al.*, 2021), and therefore more likely to focus on the entrepreneurial process with full attention and hence more likely to create a profitable new venture quicker than the middle-aged individuals. After reflecting on the arguments, some support younger and some older founders in terms of venture outcome, I would therefore hypothesise a U-shaped relationship between founder's age and duration to profitable venture creation.

Hypothesis 3: There is a U-shaped relationship between the founder's age and the duration of the creation of profitable start-ups

Education and the Hi-tech industry

New hi-tech venture creation has also been related to the availability of education as human capital (Ghio, Guerini and Rossi-lamastra, 2019) but attempts made to understand the relationship between the individual's educational profile and the new venture creation remain inconclusive both theoretically as well as empirically due to type of industry studied (Lofstrom, Bates and Parker, 2014), and building on it, this study will empirically test the relationship between educational attainment both for hi-tech and non-hi-tech start-ups.

Time, as an exchangeable resource in the economic marketplace, can help in attaining start-up strategic objectives (Das, 2019), and could be a differentiating factor for new ventures (Capocchi, 2019). It has been argued that the capability to adjust to rapid market change and the speed of development, to keep ahead of research and developments to avoid becoming obsolete/out-of-date products, are especially important to technology-based ventures (Wu, 2007; Stayton and Mangematin, 2019). Time is particularly important for hi-tech start-ups that need innovative products or services to be launched simultaneously and quickly (Stayton and Mangematin, 2019), and the speed-to-market can help them in dominating their innovation style (Tang, Byrge and Zhou, 2018). Having said that, whilst speed is important, it can take longer to reach profitability for a high-tech start-up than for a low-tech one. Liao and Welsch (2008) have found that technology-based nascent entrepreneurial efforts take longer to complete venture gestation due to their relatively higher engagement in different start-up activities (e.g. planning, resource acquisition, legitimacy establishment, etc.). It has also been argued that the acquisition of intangible assets (e.g. technology and its know-how) takes longer in the case of technology-based start-ups (Liao and Welsch, 2008). This is important because knowledge-intensive entrepreneurial initiatives, like hi-tech start-ups, rely more on intangible resources, as the study by Kamasak (2017) found that intangible resources and capabilities have a greater contribution to a firm's performance as compared to tangible resources. However, quantifiable measurements of intangible factors' contribution to entrepreneurial success are not easy (Lemelin, Koster and Youroukos, 2015). It has been also argued that intangible and knowledge-based resources can be used to create business value (Kianto, Sáenz and Aramburu, 2017), and a longitudinal study conducted by Perdreau, Nadant and Cliquet (2015) found that human capital intangibles (i.e. knowledge, know-how, skills, etc.) can significantly contribute towards venture performance. This study, therefore, seeks to establish the direct link of human capital (incl. educational attainment) to the entrepreneurial process' duration within the hi-tech and non-hi-tech industries.

Hi-tech start-ups and their growth do not only rely on technology but also require uniquely skilled people (MacVicar and Throne, 1992), particularly when nascent entrepreneurs are required to integrate varied tasks (e.g. market dynamics, negotiating with venture capitalists, intellectual property laws, etc.) in a complex process when compared to non-tech start-ups (Jianwen (Jon), Welsch and Moutray, 2009). Therefore, entrepreneurship research can benefit from treating innovation-based businesses separately (Skala, 2019) particularly when past studies on the link between human capital and innovation have produced conflicting results (Vyas and Vyas, 2019). Higher educational attainment can provide a deeper understanding of high-tech opportunity creation as students may get exposure to similar projects as part of their studies or through internships within technology start-ups, which provide them with a better understanding of managing customers and analysing markets

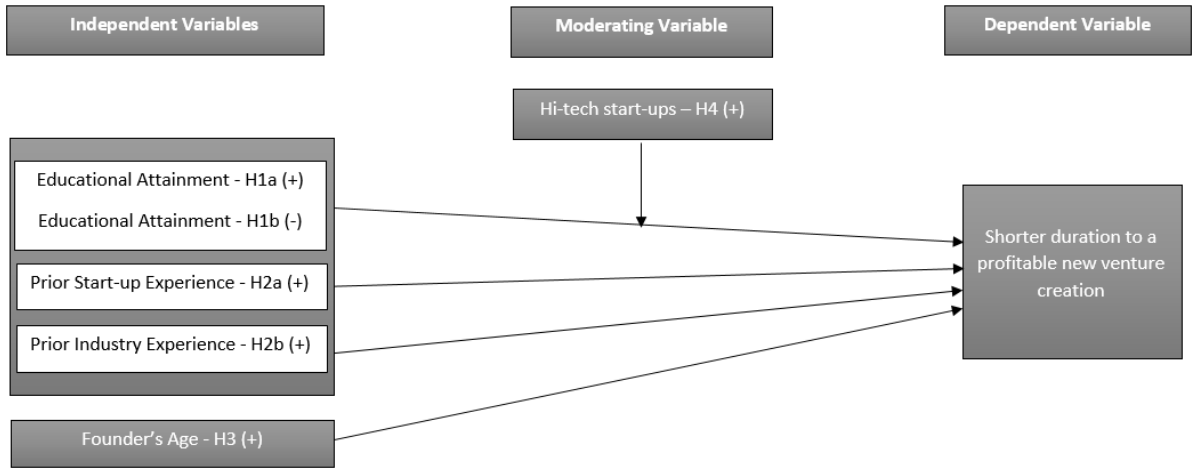
(Matthew R. Marvel, 2013). Therefore, with better customer and market insight into the hi-tech sector, individuals with higher education should be able to gain time efficiencies and I would expect them to be quicker in establishing a profitable new venture in a shorter duration of time.

On the contrary, Liao and Welsch (2008) didn't find any direct influence of educational experience when considered as a control variable, on the gestation time for hi-tech start-ups. They linked it to the technical complexities involved in hi-tech ventures and the time process of trials-and-errors and learning consume before launching a successful venture. However, unlike non-tech start-ups, technology start-ups are characterised as a knowledge-intensive process, benefitting from higher educational attainment, and helping entrepreneurs to integrate varied market demands (Jianwen (Jon), Welsch and Moutray, 2009). High-tech businesses require a higher level of knowledge from entrepreneurs as access to diversified information helps them to allocate resources efficiently, which may lead them to product innovation (Marques *et al.*, 2019), better planning and strategy adjustments leading to both time efficiencies (Doroshenko, Malykhina and Somina, 2018) and profitability. Research has shown that university (general) education is statistically significant to achieving hi-tech start-ups' investment milestones quicker benefitting from the founder's formal business and technical education (Ratzinger *et al.*, 2018). This suggests that university education helps in time efficiencies due to founders being better at resource acquisition and hence suggesting a shorter duration to profitable venture creation. A study by Fairlie and Chatterji (2013) has found that with each higher level of educational attainment, the probability of hi-tech entrepreneurship increases sharply and that individuals with a graduate degree are more likely to start a business than individuals with a college degree. Moreover, as general education has been linked to a venture's legitimacy and profitability (Lee, 2019), I would expect that it will positively impact the duration of profitable venture creation.

Hi-tech start-ups are also keen on reaching profitability or positive cash flow by accelerating sales (Marvel, Sullivan and Wolfe, 2019) as it is vital for them to become dominant players relatively quickly within their specific markets (Auschra *et al.*, 2019). Moreover, being quick in launching a hi-tech product or service provide nascent entrepreneurs with a time advantage before others imitate their product or service (Erikson, 2002). This will make these individuals more focused on the duration and given the benefits that higher education provides them; my tentative assumption is that it will help them in an early launch of a profitable hi-tech venture. I therefore posit:

Hypothesis 4: The positive effect of higher education on profitable start-up duration will be amplified for hi-tech start-ups.

Figure 2.1 Conceptual Framework



2.3 Methods

2.3.1 Data (Harmonized PSED dataset)

The hypotheses are tested utilising the harmonised data from two longitudinal studies on entrepreneurial processes conducted in the US: US PSED I (1998–2004) and US PSED II (2005–2008) (Reynolds *et al.*, 2018) which contain longitudinal data based on detailed interviews conducted over several years that allowed tracking venture creation outcome of their efforts. The PSED approach to venture creation process research captures both the antecedents as well as possible outcomes (Davidsson and Gordon, 2012) and is widely known as a data set that concentrates on the phenomenon of nascent entrepreneurship (Kessler *et al.*, 2012). To be identified as a nascent entrepreneur (PSED dataset) during the screening process, the respondent must be anticipating some ownership in a new firm; actively trying to start a new firm in the past twelve months, but there was no positive monthly cash flow covering all expenses and salaries for six of past twelve months (Renko, Harris and Caldwell, 2016). PSED has the distinct advantage of recording nascent entrepreneurs' responses before they actually embark on venture creation (Linder and Nippa, 2019) and then following them over time. This means it is better placed to avoid any survival bias which is often associated with studies on nascent entrepreneurs (Hechavarria, Renko and Matthews, 2012). The harmonised PSED, longitudinal studies (US cohorts) is based on a nationally representative sample of individuals involved in the venture creation process (Dimov, 2017; Frid *et al.*, 2016) and contain both the generic and specific human capital

indicators, which allow us to overcome the challenge of generalising results in entrepreneurial process studies.

2.3.2 Operationalisation: Dependent Variables

Hechavarria, Renko and Matthews (2012) have elaborated on three possible outcomes (i.e. new firm created, start-up process continues, start-up process quitted) for nascent entrepreneurs from the entrepreneurial process. However, eventually, nascent entrepreneurs' efforts either result in a profitable venture creation or an exit from the entrepreneurial process (Reynolds and Curtin, 2011). Thus my dependent variable is focused on these two outcomes.

Outcome: Profit

In this chapter, I have followed the Reynolds *et al.* (2018) criteria for identifying new firm birth, which is the initial presence (i.e. the date) of monthly profit, except when the date is missing, the initial presence of profits in six of twelve months was used as the venture creation date. PSED paradigm defined a new profitable firm's birth when a positive monthly cash flow is generated, covering expenses and owner-manager salaries for six of the previous twelve months (Reynolds and Curtin, 2011). US PSED I & II have used the initial presence of monthly profit as the definition of new venture creation (Reynolds et al., 2016). Successful start-up creation has been also operationalised through achieving a positive monthly cash flow that covers all expenses, owners' salaries, and wages for six months in 12 months (Reynolds, 2011). For PSED I, the question asked (firm birth criteria) was on salaries for managers who are also owners included in the expenses? and does the monthly revenue now exceed the monthly expenses? For PSED II, it would appear that you are (IF ONE OWNER: managing /IF TWO OR MORE OWNERS: helping to manage) an operating business -- one with sales and revenue greater than the ongoing expenses including salaries. Would you agree with this description of the current status? (The University of Michigan, 2022; Reynolds *et al.*, 2018).

Profitable start-up creation is a process that involves serious intentions or consideration by prospective entrepreneurs with an idea or preference for an entrepreneurial career (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015). Diochon, Menzies and Gasse's (2007) definition of new firm creation is based on process-oriented, event-driven, and theoretical perspectives covering three key dimensions, which are recency (a time immediately before birth), a form of organisation, and sales. Financial performance (27.7%) as a dependent variable was the top construct used in entrepreneurial process studies (Marvel, Davis and Sproul, 2016) and therefore I believe the criteria using a profitable outcome is the best to establish the new venture creation.

Outcome: Quit (Disengagement)

For operationalisation of disengagement criteria in this study, I have followed Reynolds *et al.* (2018) criteria, which for US PSED I was 'venture no longer worked on by anyone' and for PSED II 'less than 160 hours committed to venture creation in the last twelve months, expect to spend less than 80 hours in the next six months, no longer a major focus of the work career'. The same has also been used by (Frid, Wyman and Coffey, 2016). US PSED I and US PSED II criteria consider exit based on the respondent's confirmation of all team members if they are no longer working on the start-up (Shim and Davidsson, 2018; Reynolds, 2016). Reynolds (2011) has also used similar operationalisation, on disengagement, which is when NE has reported no efforts from the team members and he/she considers him/herself to be disengaged from the entrepreneurial process and has not reported positive cash flow that can fund business expenses and salaries for six out of the twelve months.

For PSED I, the question asked (disengagement criteria) was if the venture is no longer worked on by anyone, and for the PSED II, if less than 160 hours were devoted to the venture in the past 12 months, expect less than 80 hours of work on the venture in the next 6 months, no longer a major focus of the work career. (The University of Michigan, 2022; Reynolds *et al.*, 2018).

2.3.3 Operationalisation: Independent variables

Education

I have used Reynolds *et al.'s* (2018) criteria on education which is based on asking respondents to indicate their highest level of education. In the harmonised dataset it has been clubbed into four categories that include up to high school degree, post-high school but no BA degree, college degree, and graduate degree/experience. Education, a categorical/predictor variable, has been widely operationalised by linking it to educational attainment (Brinckmann and Kim, 2015; Davidsson and Honig, 2003; Frid *et al.*, 2016; Hopp, 2015). In PSED I, the question asked was What is the highest level of education [NAME] has completed - (up to the eighth grade, some high school, high school degree, technical or vocational degree, some college, community college degree, a bachelor's degree, some graduate training, a master's degree, or a law degree, medical degree, or Doctorate?). In PSED II, the questions were on what is the highest level of education you have completed (up to the eighth grade, some high school, high school degree, technical or vocational degree, some college, community college degree, college degree, some graduate training, MBA-MA-MS degree, LLB-MD-PHD-EDD degree, or refused) (The University of Michigan, 2022; Reynolds *et al.*, 2018).

Entrepreneurial experience

Following previous PSED studies (Davidsson and Gordon, 2016; Frid *et al.*, 2016) I operationalised previous start-up experience as a binary variable measuring whether the respondent had prior start-up experience (1) or not (0). First, I did it because 53% of PSED I respondents and 55% of PSED II respondents had no start-up experience and the remaining had prior start-up experience most of them ranged from one to ten but there were few with an even greater number of start-ups mentioned. Davidsson and Gordon (2016) have also used the prior start-up experience variable as yes (1) or not (0). Laffineur *et al.* (2020) also built a dichotomous variable from the PSED II dataset for start-up experience as yes (1) or not (0). In PSED I and PSED II, the question asked was How many other businesses has (NAME) helped to start as an owner or part owner? (The University of Michigan, 2022; Reynolds *et al.*, 2018).

Industry experience

For this study, I have used binary variables measuring whether the respondent had prior industry experience or not. 26% of PSED I respondents and 22% of PSED II respondents had no prior industry experience and the remaining who had prior industry experience may have found it difficult to recall the exact length of time, some even giving up to sixty years of industry experience. I, therefore, think that having industry experience or not is a more appropriate measure. In PSED I, the question asked was How many years of work experience have you had in this industry – the one where the new business will compete? In PSED II, the question asked was how many years of paid work experience you have in the industry where the new business will compete, enter '1' for one year or less, excluding zero (The University of Michigan, 2022; Reynolds *et al.*, 2018).

Age

Age being a continuous variable has been self-reported by the respondents in the PSED sample (Frid *et al.*, 2016). Li and Dutta (2018) operationalised age as the average age of founding team members, calculated as the mean of team members' ages. In my sample, I have applied the upper age limit to 75 years, as the upper age recorded in the harmonised dataset for US PSED I was seventy-four (74), for PSED II, fourteen individuals were over 74 years highest being eighty-three (83) years old. Moreover, I have tested age based on nascent entrepreneur's age groups to establish the most productive nascent entrepreneur groups in terms of age group. In PSED I, the question (R684) asked was how old (is NAME/are you?

12-100). In PSED II, the question (H2) asked was how old are you/is NAME? (The University of Michigan, 2022; Reynolds *et al.*, 2018).

Hi-Tech

I have used Reynolds' (2016) hi-tech venture classification which is based on three items reflecting the technological sophistication of the firm, mentioned in table 1 (descriptive statistics). In PSED studies, nascent entrepreneurs were asked “would you consider this (new) business to be hi-tech?”. If hi-tech (1) and if not, it was coded zero (0) (Li and Dutta, 2018). The venture creation duration also depends on the venture type (Gordon and Davidsson, 2013; Samuelsson and Davidsson, 2009; Liao and Welsch, 2008), and technology intensity and innovativeness may impact the prospects of venture creation (Brinckmann and Kim, 2015; Khan, Tang and Joshi, 2014; Hechavarria, Renko and Matthews, 2012). Nascent entrepreneur’s industry type, high-technology vs low-technology, has also been used in a study by Li and Dutta (2018). Both in the PSED I and PSED II, the question asked was would you consider this new business to be hi-tech? (The University of Michigan, 2022; Reynolds *et al.*, 2018).

2.3.4 Operationalisation: Control variables

Gender

Gender has been widely used as a control variable (Laffineur *et al.*, 2019; Davidsson and Gordon, 2016; Brinckmann and Kim, 2015; Renko, Harris and Caldwell, 2015; Raffiee and Feng, 2014; Hechavarria, Renko and Matthews, 2012; Dimov, 2010) because men are more likely to enter in the entrepreneurial process than women (Hechavarria, Renko and Matthews, 2012a; Coleman and Robb, 2009). Although the entrepreneurial propensity of women is lower than men, Koellinger, Minniti and Schade (2013) found the survival chances to be the same across genders. Men are also found to be more (x1.5) likely to undertake nascent entrepreneurship activities than women (van der Zwan, Verheul and Thurik, 2012), which may impact the likelihood of an earlier process outcome. I am therefore controlling for gender, which in the harmonised PSED dataset, is coded as: males (1) and females (2). In the PSED I, the question asked was is NAME/Are you male or female? In PSED II, the question asked, is [NAME]) male or female? (The University of Michigan, 2022; Reynolds *et al.*, 2018). (The University of Michigan, 2022; Reynolds *et al.*, 2018).

Work experience

In PSED datasets the question was asked about years of work experience (full-time, paid work) and is recorded as a continuous variable in the harmonised dataset (Reynolds, 2007). Almost 100% of the individuals in both US cohorts mentioned one or above (up to 64 years) years of work experience. I have therefore used binary measure, no work experience (0), and work experience (1). The founder's work experience has been considered a key resource for new venture creation (Colombo and Grilli, 2005; Honoré, 2022). Different measures for work experience have been adopted ranging from the average team experience (Honoré, 2022) to a continuous variable (years) (Coleman and Robb, 2009). In PSED I, the question asked was how many total years of full-time, paid work experience in any field have you had? In PSED II, the question asked was how many years of paid work experience you have, enter '1' for less than one year.

The reason for using work experience as a control variable in this chapter is that though it is considered a predictor of entrepreneurial intention as it allows individuals to see other entrepreneurs/businesses making a profit, which may encourage them to pursue the entrepreneurial process (Bignotti and Roux, 2020), however, that learning could be more context-dependent (Markowska *et al.*, 2019), would only impact on entrepreneurial process start-up activity level e.g. business planning (Brinckmann and Kim, 2015) and therefore not found sufficient for new venture creation (Parker and Belghitar, 2006). Stuetzer, Goethner and Cantner (2012) also used work experience, accumulated prior to the entry into the venture creation process, as a control variable and found it not directly related to the successful venture creation.

Time devoted

Davidsson (2011) has argued that NEs' have different time availability because of their part-time/full-time status which gives part-timers more time to spend on the new venture, and I would believe they would be able to concentrate better on new start-ups and hence can have a better and earlier venture process outcome. A PSED-based study also found that part-time nascent entrepreneurs are not affected by financial constraints as they have an alternative income stream (wage employment) to count on (Petrova, 2012), which may help them continue with the venture creation process and have lower financial constraints may also help them to speed up the process. This is why I am controlling for time devoted to the new venture creation process. The time commitment (i.e. full-time versus part-time) to the start-up also impacts entrepreneurial propensity, which in the case of full-time entrepreneurs, starts to decline from the thirties with a further accelerated decline in individuals in their sixties (Zhang

and Acs, 2018). This is another reason to control for time spent on venture creation as I am also testing the age-related model. In PSED I the question was, have you begun to devote full time to the business – 35 or more hours per week? In PSED II it was, In the past twelve months, (have you devoted/did you devote) more than one hundred sixty hours -- four weeks of full-time work –- to this (new) business (start-up)? And Over the next six months, do you expect to spend more than eighty hours - two weeks of full-time work on this (new) business (start-up)?

Team Size

I have controlled for team size because a larger founding team can have the advantage to obtain more resources compared to start-ups with smaller teams and hence can complete the start-up tasks and processes relatively fast (Delmar and Shane, 2006; Symeonidou et al., 2022). Moreover, as team members may compensate for other members' shortcomings (Kier and Mcmullen, 2020) and the team size can give an advantage in terms of pooled resources Davidsson (2012), I have added team size as a control. This is also in line with another PSED-based study by Renko (2013), whereby team size was used as a control because of the effect of time being confounded by the size of the team. Hechavarria, Renko and Matthews (2012a) also controlled for team size as larger teams positively influence the availability of human capital. Both PSED I and PSED II captured a series of questions for up to five (5) founding team members/owners and their relationships.

Business Idea

Around 23% of respondents in PSED I and II mentioned their desire to work on a new idea of their own which made them enter the entrepreneurial process (Reynolds, 2018). The initial business idea is considered a key factor that drives entrepreneurial entry (Giones *et al.*, 2013) and increases commitment during the entrepreneurial process (Fayolle and Liñán, 2014), which may impact both the duration as well as the likelihood of a profitable venture outcome. I have therefore controlled for the Initial business idea variable. This variable was derived from the question in PSED I asking, which came first for you, the business idea or your decision to start a business - or did they occur together? In PSED II, the question was, which came first for you, the business idea or your decision to start some kind of business?

Entrepreneurial Desire

Entrepreneurial desire is associated with entrepreneurial intentions (Riquelme and Lanqawi, 2016) and may increase an individual's tendency to organise an entrepreneurial effort in a better way (Solesvik, 2013) to speed up the implementation of the business idea (Johnson,

1990). Entrepreneurial desire can also make them put significant effort into new venture creation (Cardon and Kirk, 2015; Karimi, 2020). I have therefore controlled for the entrepreneurial desire as it may impact the entrepreneurial process duration and outcome. This variable was derived from the question in PSED I asking, which came first for you, the business idea or your decision to start a business - or did they occur together? In PSED II, the question was, which came first for you, the business idea or your decision (desire) to start some kind of business?

2.3.5 Estimation strategy

In this chapter, I am studying the duration of profitable venture creation and I am therefore using two of the duration (survival/hazard) models, namely Cox and Competing Risks Models, and related graphical presentation. Survival models capture the survival duration (i.e. the amount of time one survives) before an event of interest occurs (Raffiee and Feng, 2014) and Shumway (2001) has suggested that what distinguishes hazard models from static models is their capacity to explicitly account for time.

Cox Model

Time-to-event outcomes have been present in many fields of research and survival data analysis has been frequently completed by using the Cox proportional hazards regression model (Austin, 2017). This semiparametric model has been widely used to analyse time-to-event data to produce results that are typically summarised with a hazard ratio and 95% confidence interval (Perera and Dwivedi, 2019). A study by Renko, Harris and Caldwell (2015) has also used the Cox Proportional Hazards model (Cox, 1972) to ascertain which variables contribute more towards the probability of NEs' start-up initiatives, ending at a successful launch of a new venture, as a function of time. Backman and Karlsson (2020) also used the Cox model to estimate the relationship between the firm stakeholders' age and the firm's survival. Tietz, Lejarraga and Pindard-lejarraga (2021) have conducted a PSED-based study and have used the Cox model to investigate the effects of industry and start-up experiences on income expectation and persistence of nascent entrepreneurs. Few other studies have also argued for the hazard model to be used to analyse PSED data (Brush, Manolova and Edelman, 2008; Townsend, Busenitz and Arthurs, 2010). A key benefit of using hazard models is the censoring and as some individuals remained within the gestation process until the study was completed, such cases get censored, and hence the use of hazard models is found to be an efficient way to analyse these datasets (Townsend, Busenitz and Arthurs, 2010).

Over time, all nascent entrepreneurs in the PSED would have either started a business or abandoned their start-up initiatives (Townsend, Busenitz and Arthurs, 2010), therefore, I have used the Cox model in this study to test the hypothesis for the hazard rate of profitable venture creation. Cox proportional hazards model provides both the hazard ratios as well as regression coefficients and can help with interpreting the risk of experiencing a particular event associated with a predictor variable (Raffiee and Feng, 2014).

Kaplan-Meier survival Curve (Graphs)

Kaplan-Meier survival estimator, a non-parametric model, is usually used for descriptive purposes (Ejermo and Xiao, 2014) and to establish the estimated levels of survival (Cabrer-Borrás and Rico Belda, 2018). I will plot survival probability against a profitable venture creation by distinguishing between different types of founders' human capital factors and age groups. The Kaplan-Meier survival method will allow me to analyse the duration of the profitable venture being created. A key feature of this technique is that the time intervals are dictated by the occurrence of the event of interest and are not established in advance (D'Arrigo *et al.*, 2021).

Competing Risks model

Duration models are used to analyse the relationship between time spent in a particular state and the characteristics of interest (Szydłowski, 2019). The competing risks model is regarded as a suitable model to analyse duration data with multiple event types (Chao and Kobayashi, 2017). Competing risks occur when individuals can experience one or more outcomes that compete with the outcome of interest (Noordzij *et al.*, 2013). Competing risks are often present in survival data analysis as there are events that can occur before the primary event of interest stopping it to happen (Chao and Kobayashi, 2017; Austin, Lee and Fine, 2016). Competing-risks modelling assumes that the subject is at risk to experience potentially more than one outcomes (Raffiee and Feng, 2014), which in my case is a profitable outcome of the start-up initiative. A competing risk can also be defined as an event that either impede the observation of the expected outcome (i.e. the event of interest) or modifies the chance that this event occurs (Noordzij *et al.*, 2013). Failure to acknowledge competing risks during analysis would result in risk being overestimated (Perera and Dwivedi, 2019) as in my data, founders may disengage from the entrepreneurial process before they launch a profitable new venture. For my data, the competing risk of the likelihood of founder leaving the entrepreneurial process is explicitly taken into account and will therefore help in accurately determining an outcome risk (Berry *et al.*, 2010).

Competing Risks Graphs

I have also provided the geographical representation of competing risk models, which shows the cumulative incidence function of our independent variables for a new profitable firm formed given the competing risk of the founder's quitting the process. This will show the reduction or increase in the subhazard (Cleves, Gould and Marchenko, 2016) due to the human capital factors, hi-tech (industry type), and different age groups. This model is estimated at the mean of covariates and has also been used in other entrepreneurial process outcome-based studies (Hechavarría, Matthews and Reynolds, 2016).

As I mentioned at the start of this section, duration models are used to analyse the relationship between time spent in some state and observed characteristics (Szydłowski, 2019) and, therefore, the discrete and continuous time hazard models (i.e. Cox model, in this chapter) are considered to be best placed for estimating the effect of individual characteristics on the occurrence of an entrepreneurial outcome (Parker, 2018a). Furthermore, to account for the competing risks (i.e. possibility of the founder's exit), I have introduced the competing risks model, which is considered a better model than the 1-cause Cox model (Peter C. Austin, Lee and Fine, 2016). These models are a better choice for my duration study because it has also been argued that logistic regression is not an efficient way to study the length of time to a particular event of interest (Schober and Vetter, 2018) and hence I opted for, now increasingly used and well trusted (including in entrepreneurship field), the Cox and competing risks models.

2.4 Results

2.4.1 Descriptive statistics

In the harmonised PSED dataset, the PSED I sample size (nascent entrepreneurs) is 830 and PSED II is 1,214. Male/Female distribution (PSED 427/403, PSED II 761/453), Time allocation FT/PT (PSED I 384/446, PSED II 360/854), and PSED one founder for 50% start-ups and for PSED II it was 54%.

Table 2.1 and 2.2 shows descriptive statistic and correlations for all variables. The majority of correlations for Outcome Profit (i.e. study focus) are low to moderate, but some correlations exceed 0.50, notably among the variables for different types of general and specific human capital factors, age and human capital factors, and team size and human capital factors. The correlation between industry type (hi-tech) and the team size also exceeds 0.50. These correlations increase the probability that Type I errors (i.e., not finding a relationship when there is one) and significance levels will be underestimated.

Table 2.1 Variable descriptive statistics

Variables	Definition / Criteria (Reynolds *et al.*, 2016)	Mean	Std. Dev.	min	max
OutcomeProfit (Profitable Venture Created)	A firm birth. is considered to be the initial presence of monthly profits that covers expenses and owner salaries.	.15	.357	0	1
OutcomeQuit (Disengagement)	US PSED I: No longer worked on by anyone. US PSED II: Less than 160 hours devoted to venture in past 12 months, expect less than 80 hours of work on the venture in the next 6 months, no longer a major focus of the work career.	.193	.395	0	1
EduAttainment	Educational attainment (level) of team member 1 (respondent). Represented in regression by a set of indicator variables. 1 = up to high school degree; 2 = post-high school, pre-college degree; 3 = college degree; 4 = graduate degree	2.309	.982	1	4
WorkExperience	Work experience (years) of team member 1 (respondent)	.986	.118	0	1
StartupExp	Other start-up experience. Have helped to start other businesses as an owner or part-owner = 1.	.457	.498	0	1
IndustryExp	Same industry experience. Years of work experience in the industry where the new business will compete.	.766	.423	0	1
Age	Age of Respondent (alternatively categorised into age groups).	41.691	12.069	18	74
HighTechOrNot HighTech=1, Not Hi-Tech=0	Consider business hi-tech? Based on three items reflecting the technological sophistication of the firm: • Were the technologies or procedures required for this product or service generally available more than a year ago? • Were the technologies or procedures required for this product or service generally available more than five years ago? • Will spending on research and development be a major priority for this (new) business?	.287	.452	0	1
Gender	Declared gender (Respondent)	1.418	.493	1	2
TeamSize	Total number of owners	1.665	.883	1	5
BusinessIdea	Source of initial motivation (business idea) of team member 1 (respondent) = 1	.769	.421	0	1
EntrepreneurialDesire	Source of initial motivation (desire to be an entrepreneur) of team member 1 (respondent) = 1	.633	.482	0	1
FullTimeBasis	Full time start-up work	36.386	48.111	0	100

Table 2.2 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) OutcomeProfit	1.000												
(2) OutcomeQuit	-0.206*	1.000											
(3) EduAttainment	0.047*	-0.013*	1.000										
(4) WorkExperience	0.026*	-0.014*	0.073*	1.000									
(5) StartupExp	0.042*	-0.025*	0.164*	0.050*	1.000								
(6) IndustryExp	0.015*	-0.087*	0.034*	0.005	0.035*	1.000							
(7) Age	0.023*	-0.010	0.208*	0.142*	0.253*	0.023*	1.000						
(8) HighTechOrNot	0.008	-0.043*	0.013*	0.000	0.011	0.019*	-0.038*	1.000					
(9) Gender	-0.025*	0.032*	0.046*	-0.020*	-0.032*	-0.098*	0.035*	-0.129*	1.000				
(10) TeamSize	0.053*	-0.018*	0.071*	-0.011	0.008	-0.065*	-0.032*	0.046*	-0.067*	1.000			
(11) BusinessIdea	-0.020*	0.010	-0.011	0.017*	-0.015*	0.095*	0.038*	-0.024*	-0.010	-0.009	1.000		
(12) EntrepreneurialDesire	0.027*	-0.008	-0.078*	0.002	-0.018*	0.009	-0.008	0.022*	-0.020*	-0.028*	-0.417*	1.000	
(13) FullTimeBasis	0.159*	-0.105*	0.002	-0.033*	0.034*	0.122*	-0.003	0.048*	-0.043*	0.001	-0.057*	0.056*	1.000

**** p<0.01, ** p<0.05, * p<0.1*

2.4.2 Results

Model 1 in Table 3 displays the hazard ratios and regression coefficients from the Cox model. Model 2 in Table 4 displays the results of sub-hazard ratios and regression coefficients from the competing-risks (exit) regression based on Fine and Gray's proportional sub-hazards model. Model 3 in Table 5, where the effects of interactions between educational attainment and venture type (hi-tech/non-hi-tech) are treated. Model 4 in Table 6 shows the competing risks regression based on age groups.

Hypotheses were tested in four models, as reported in Tables 2.3 to 2.6. Table 2.3 presents the results of the Cox hazard model allowing us to test the influence that my variable of main interest has on the entrepreneurial process duration to a profitable outcome of the nascent entrepreneur's start-up initiative. Reported hazard ratios (HRs) above 1 indicate a higher incidence of a profitable outcome and shorter duration, and HR below 1 indicates the reverse, that is, a lower incidence of a profitable outcome and longer duration. The results of the Cox proportional hazard model are presented in Table 2.3, where the dependent variable was a profitable venture outcome, and the hazard ratio shows the predicted change in the hazard (profitable outcome) for a unit increase in the predictor or independent variable. The table shows both the hazard ratios and the coefficient estimates. From the table, we can see that educational attainment and start-up experience were significant in predicting the shorter duration to profitable venture creation. Having a graduate experience/degree results in a 25% increase in the hazard rate (i.e. shorter duration to a profitable outcome) compared to founders with up to a high school degree and is significant ($p<0.01$). The increase in hazard (risk) for graduate degree holders could be as large as 37% or as small as 14% (95%CI for hazard ratio 1.141-1.366). The post-high school educational attainment is also found to result in a 23% increase in the hazard rate and is significant ($p<0.01$) for my dependent variable, however, the graduate degree holders still have the highest hazard rate among all, meaning that they are better placed to establish a profitable venture in a shorter period. The findings were different from the expected linear effect that more education is better, so it does not completely support my hypothesis. The results partially support the arguments put forth in H1. When comparing post-HS and college degree level attainment, the college degree holders have a lower hazard rate than the individuals with no BA degree. The results are showing an inverted S-shaped effect, which suggests that although a graduate degree is more valuable in terms of shorter duration to a profitable outcome than a college degree, having a college degree would not help in creating a profitable new venture in a shorter period.

Table 2.3 Cox regression model

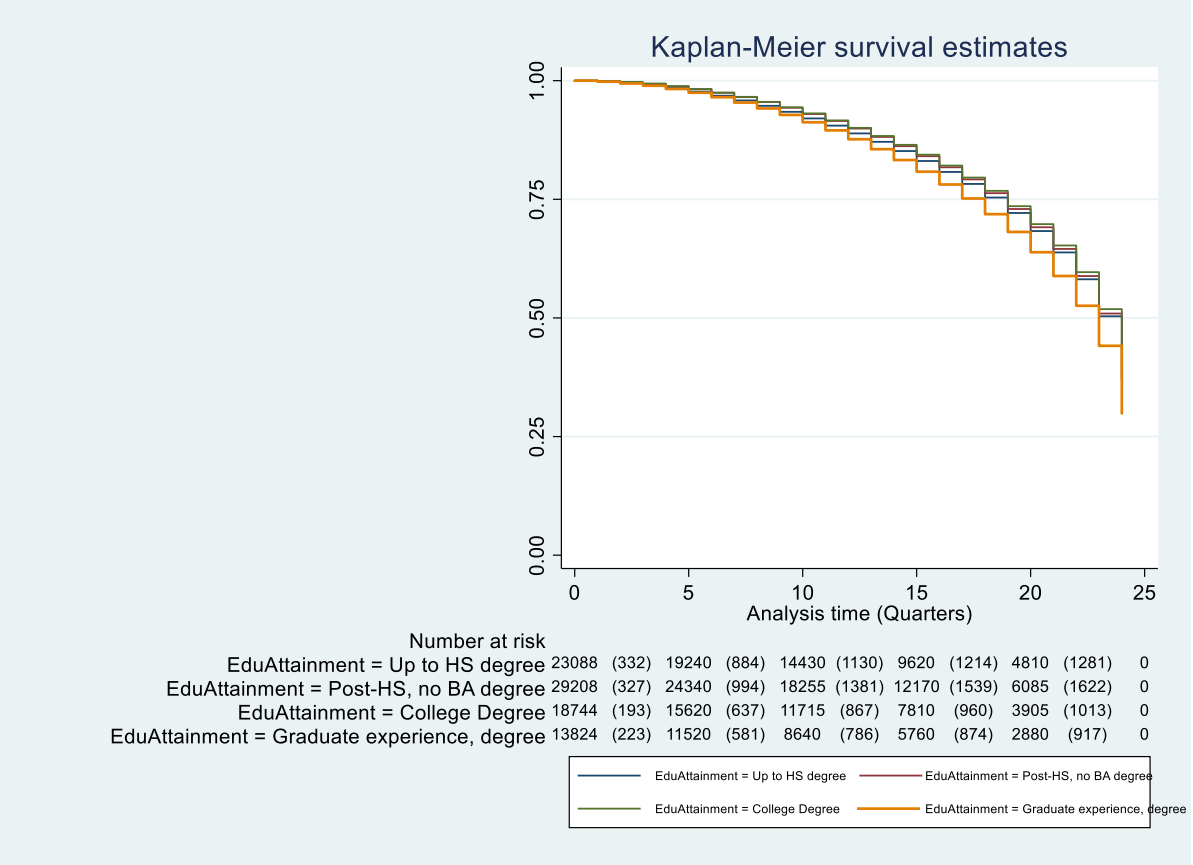
VARIABLES	(1) - Outcome Profit HR (Profit)	Cox	95% Conf. Interval	
Educational Attainment (Baseline: Up to HS degree)				
Post-HS, no BA degree	1.230	0.207***	1.143	1.324
		(0.037)		
College Degree	1.085	0.081*	0.997	1.18
		(0.043)		
Graduate experience, degree	1.246	0.222***	1.141	1.366
		(0.046)		
Startup Experience (Baseline: No StartupExp)				
Have Startup Experience	1.109	0.104***	1.051	1.171
		(0.028)		
Industry Experience (Baseline: No IndustryExp)				
Have Industry Experience	1.019	0.019	0.956	1.086
		(0.033)		
Age	1.019	0.019**	1.004	1.004
		(0.007)		
c.Age#c.Age	0.999	-0.000**	0.999	0.999
		(0.000)		
Sector (Baseline: Non-hi-tech)				
High-tech	0.925	-0.078***	0.871	0.981
		(0.030)		
Gender (Baseline: Male)				
Female	0.874	-0.135***	0.827	0.923
		(0.028)		
Work Experience (Baseline: No work Experience)				
Have work Experience	1.438	0.363**	1.086	1.905
		(0.143)		
Team Size (Baseline: One owner)				
Two owners/team members	1.185	0.169***	1.119	1.253
		(0.029)		
Three owners/team members	0.854	-0.158**	0.753	0.967
		(0.064)		
Four owners/team members	1.232	0.208***	1.085	1.398
		(0.065)		
Five or more owners/team members	2.527	0.927***	2.161	2.954
		(0.080)		
Business Idea (Baseline: No Business Idea)				
Business Idea	1.027	0.027	0.957	1.102
		(0.036)		
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)				
Entrepreneurial Desire (had entrepreneurial desire)	1.093	0.089***	1.028	1.162
		(0.031)		
Time Devotion (Baseline: Not F/T)				
Full Time Basis	1.006	0.006***	1.006	1.007
		(0.000)		
Project (Baseline: PSED II)				
US PSED I	1.236	0.212***	1.165	1.311
		(0.030)		
Observations		39,360		
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Additionally, my results demonstrate that individuals with prior start-up experience have a higher (11%) hazard rate than those with no prior start-up experience and the results were significant ($p<0.01$), which supports my H2a that successful start-ups' duration will be shorter for individuals with prior entrepreneurial experience. The increase in hazard (risk) for individuals with prior start-up experience could be as large as 17% or as small as 5% (95%CI for hazard ratio 1.051-1.171). However, my results from the Cox model do not show that industry experience impacts the duration to a profitable outcome, hence, rejecting my H2b. My results on age have shown marginal (2% higher hazard rate) and the results are significant ($p<0.05$). However, I am checking the impact of different age groups in the competing risks model (Table 6).

Kaplan-Meier method (Cox graphs)

The Kaplan-Meier method estimates the probability of survival up until a certain time point (time t) in the presence of censored cases (Noordzij *et al.*, 2013). However, this method focus on a single event at a time and all other events are treated as censored observations (Noordzij *et al.*, 2013). It can be seen from the graph below that nascent entrepreneurs with post-graduate degrees (higher educational attainment) have a lower survival probability, meaning they are more likely to launch a profitable start-up in a shorter duration of time. Moreover, the actual incidences, given in brackets, for individuals with graduate degrees are higher than others with lower educational attainment throughout all of the quarters on the scale. Figure numbering is provided on top of the figures.

Figure 2.2 Kaplan-Meier survival estimates (Educational Attainment)



Similarly, nascent entrepreneurs with previous start-up experience can be seen to have a lower survival probability, meaning is more likely to launch a profitable start-up in a shorter duration of time. Nascent entrepreneurs with previous industry experience can be seen as having a lower survival probability, meaning is more likely to launch a profitable start-up in a shorter duration of time, however, the results were not found to be significant in the Cox model.

Figure 2.3 Kaplan-Meier survival estimates (Start-up Experience)

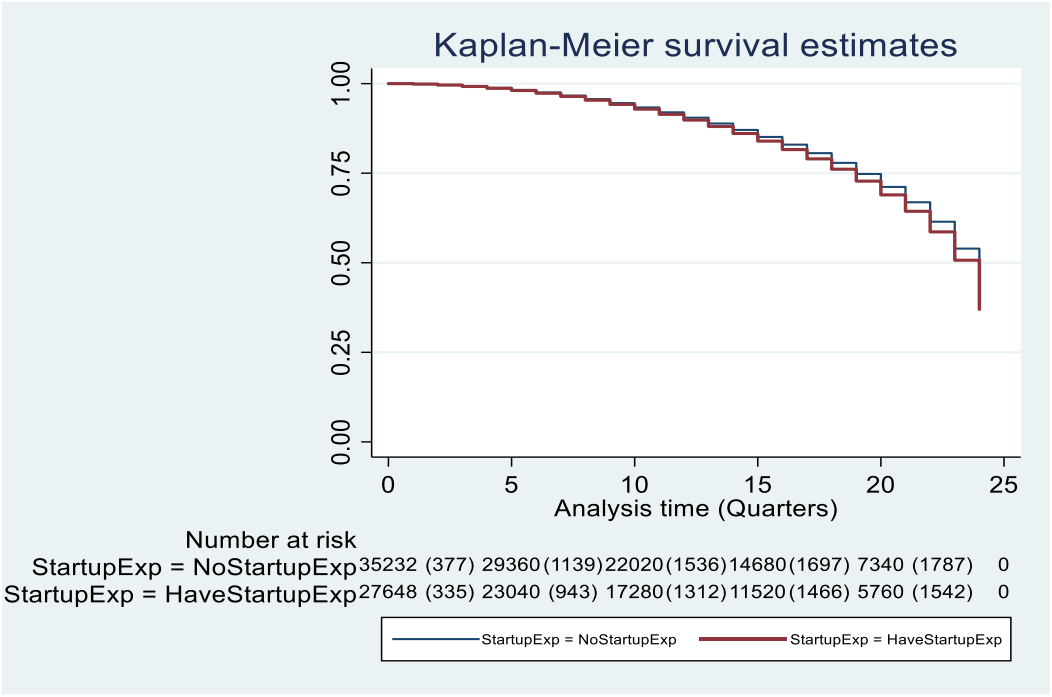


Figure 2.4 Kaplan-Meier survival estimates (Industry Experience)

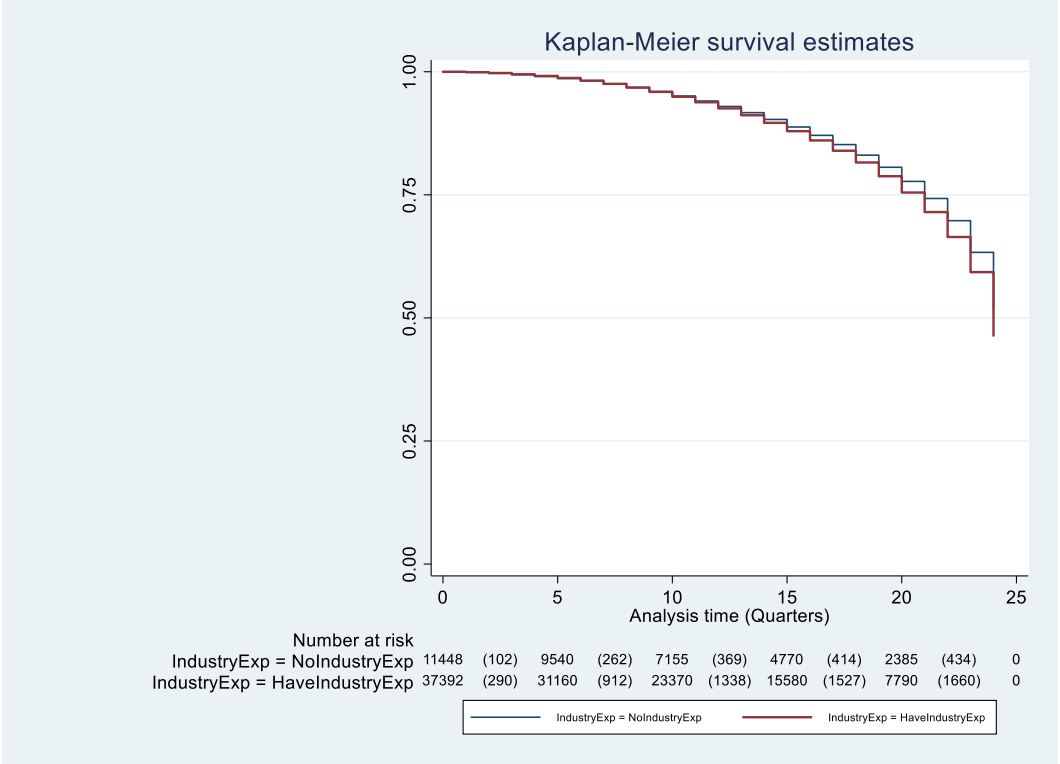


Table 2.4 Competing Risk Model

Coefficients from the Competing-risks model are displayed in Table 2.4 (Model 2), given below.

VARIABLES	(2) - Profit (competing with Quit) SHR (Profit)	Comprting Risks	95% Conf. Interval	
Educational Attainment (Baseline: Up to HS degree)				
Post-HS, no BA degree	1.301	0.263***	1.210	1.398
		(0.037)		
College Degree	1.096	0.092**	1.009	1.190
		(0.042)		
Graduate experience, degree	1.304	0.265***	1.193	1.425
		(0.045)		
Startup Experience (Baseline: No StartupExp)				
Have Startup Experience	1.127	0.119***	1.068	1.188
		(0.027)		
Industry Experience (Baseline: No IndustryExp)				
Have Industry Experience	1.102	0.097***	1.035	1.173
		(0.032)		
Age	1.018	0.018**	1.004	1.033
		(0.007)		
c.Age#c.Age	0.999	-0.000**	0.999	0.999
		(0.000)		
Sector (Baseline: Non-hi-tech)				
High-tech	0.918	-0.086***	0.867	0.971
		(0.029)		
Gender (Baseline: Male)				
Female	0.850	-0.163***	0.806	0.896
		(0.027)		
Work Experience (Baseline: No work Experience)				
Have work Experience	1.524	0.421***	1.141	2.035
		(0.148)		
Team Size (Baseline: One owner)				
Two owners/team members	1.221	0.200***	1.156	1.290
		(0.028)		
Three owners/team members	0.850	-0.162***	0.754	0.959
		(0.061)		
Four owners/team members	1.285	0.251***	1.133	1.459
		(0.064)		
Five or more owners/team members	2.696	0.992***	2.343	3.102
		(0.072)		
Business Idea (Baseline: No Business Idea)				
Business Idea	1.075	0.072**	1.004	1.150
		(0.035)		
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)				
Entrepreneurial Desire (had entrepreneurial desire)	1.099	0.094***	1.034	1.167
		(0.031)		
Time Devotion (Baseline: Not F/T)				
Full Time Basis	1.007	0.007***	1.007	1.008
		(0.000)		
Project (Baseline: PSED II)				
US PSED I	1.414	0.346***	1.335	1.496
		(0.029)		
Observations		39,360		
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Hypothesis 1(a) predicts that the duration to profit for start-ups will be shorter for individuals with higher educational attainment. Results from Model 2 do not completely support my hypothesis as the result is not linear and is showing an inverted S-shaped outcome. The coefficient for risk aversion predicting successful start-up creation was positive and significant (0.27, $p<0.01$) for graduate experience/degree when compared to the baseline qualification (i.e. up to high school degree). The estimated subhazard ratio (SHR>1) also implies that NEs with higher educational attainment have increased the subhazard (risk) of an earlier profitable new business launch. The increase in subhazard (risk) for graduate degree holders could be as large as 43% or as small as 19% (95% CI for subhazard ratio 1.193-1.425). Moreover, my results show that for post-high school/no BA degree qualification, the coefficient for risk aversion predicting successful start-up creation was also positive and significant (0.26, $p<0.01$) when compared to the baseline qualification (i.e. up to high school degree). The estimated subhazard ratio (SHR>1) also implies that nascent entrepreneurs with post-high school/no BA degree qualification have increased the subhazard (risk) of an earlier profitable new business launch. The increase in subhazard (risk) for post-high school/no BA degree qualification could be as large as 40% or as small as 21% (95% CI for subhazard ratio 1.210-1.398).

Hypothesis 1(b) predicts that the duration to profit for start-ups will be longer for individuals with higher educational attainment, which is not supported by my results.

Hypothesis 2(a) predicts that the duration to profit for start-ups will be shorter for individuals with prior entrepreneurial experience. The coefficient for risk aversion predicting successful start-up creation was positive and significant (0.12, $p<0.01$) for individuals with prior start-up experience when compared to the baseline (i.e. no start-up experience) The estimated subhazard ratio (SHR>1) also implies that nascent entrepreneurs with prior entrepreneurial experience are more likely to create a profitable start-up in a shorter duration of time. The increase in subhazard (risk) for nascent entrepreneurs with prior start-up experience could be as large as 19% or as small as 7% (95%CI for subhazard ratio 1.068-1.188). My results, therefore, support H2(a).

Hypothesis 2(b) predicts that the duration to profit for start-ups will be shorter for individuals with prior industry experience. The coefficient for risk aversion predicting successful start-up creation was positive and significant (0.10, $p<0.01$) for individuals with prior industry experience when compared to the baseline (i.e. no industry experience) The estimated subhazard ratio (SHR>1) also implies that nascent entrepreneurs with prior industry experience are more likely to create a profitable start-up in a shorter duration of time. The increase in subhazard (risk) for nascent entrepreneurs with prior industry experience could

be as large as 35% or as small as 17% (95%CI for subhazard ratio 1.035-1.173). My results, therefore, support H2(b). It is interesting to note here that in the previous (Cox model – table 3), the effect of prior industry experience on my dependent variable was not found to be significant but by introducing robustness (Competing Risks Model) the results have been significant and in favour of prior industry experience. I would go with the results of the competing risks model given that the model analyses duration data with multiple event types, which in my case was the possibility of the founder's disengagement (quit).

2.4.3 Results (in Graphical form)

Competing Risks Graphs (stcurve command)

The estimated survivor function for competing risks analysis is provided below. The increase in subhazard (i.e. duration to profit for start-up) due to higher human capital accumulation directly translates to an increase in the cumulative incidence of duration to profit for start-up (Cleves, Gould and Marchenko, 2016).

The first graph shows that both the graduate degree and post-high school qualification have a higher cumulative incidence of duration to profit for a start-up. This also shows the effect my results in the competing risks model show (i.e. inverted S-shaped outcome). Founders with prior start-up experience and founders with prior industry experience have a higher cumulative incidence of duration to profit for a start-up.

Figure 2.5 Comparative cumulative incidence functions (Educational Attainment)

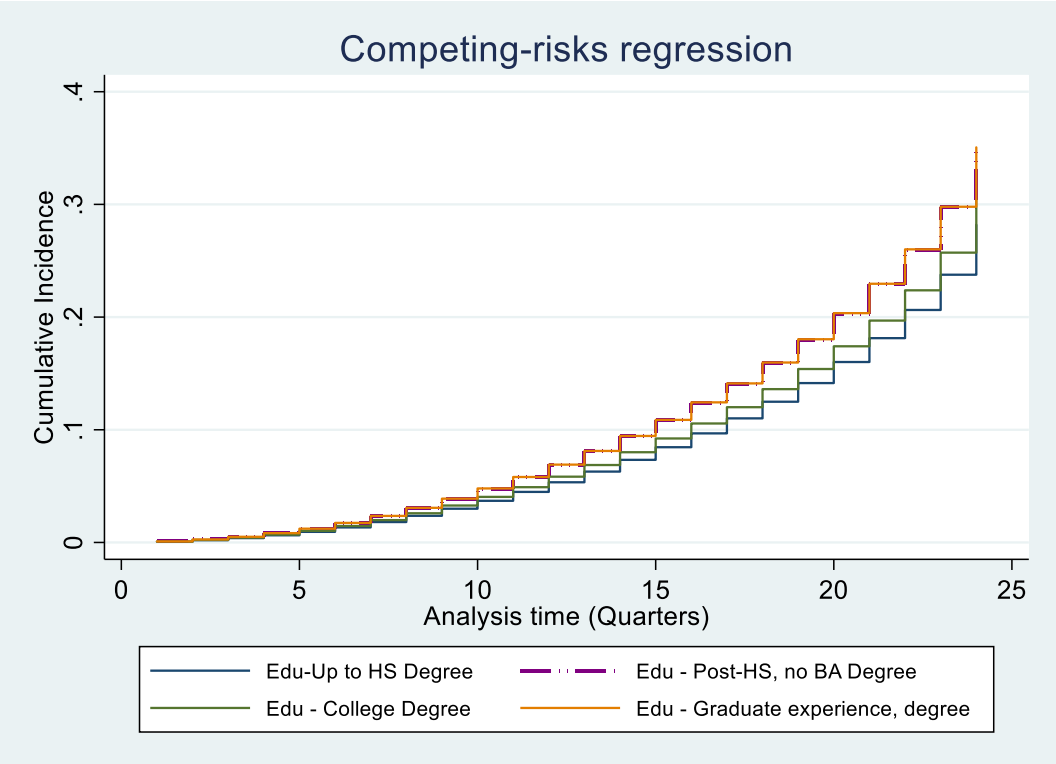


Figure 2.6 Comparative cumulative incidence functions (Start-up Experience)

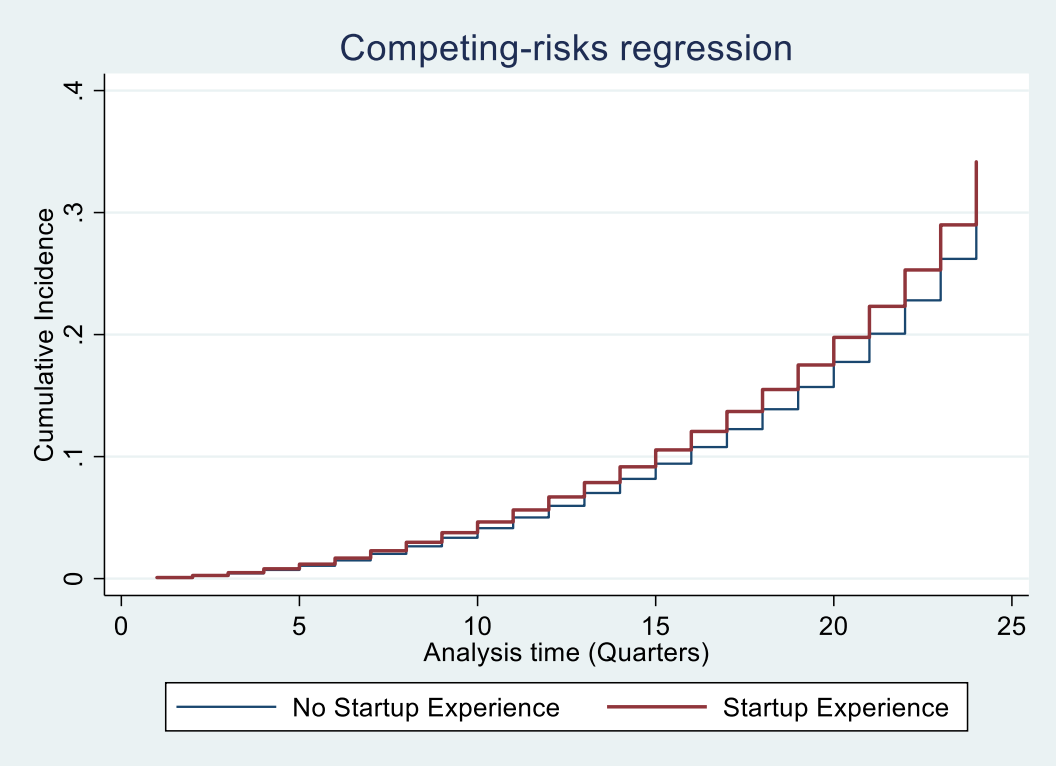


Figure 2.7 Comparative cumulative incidence functions (Industry Experience)

Table 2.5 Competing Risks (Exit) – Education and Hi-Tech Interactions

VARIABLES	(3)- Profit (competing with Quit) SHR (Profit)	Competing Risk	95% Conf. Interval	
Educational Attainment (Baseline: Up to HS degree)				
Post-HS, no BA degree	1.160	0.149***	1.070	1.259
		(0.042)		
College Degree	1.032	0.031	0.942	1.131
		(0.047)		
Graduate experience, degree	1.051	0.050	0.948	1.166
		(0.053)		
Startup Experience (Baseline: No StartupExp)				
Have Startup Experience	1.125	0.118***	1.067	1.186
		(0.027)		
Industry Experience (Baseline: No IndustryExp)				
Have Industry Experience	1.090	0.086***	1.023	1.161
		(0.032)		
Age	1.017	0.017**	1.002	1.031
		(0.007)		
c.Age#c.Age	0.999	-0.000*	0.999	1.000
		(0.000)		
Sector (Baseline: Non-hi-tech)				
High-tech	0.558	-0.583***	0.476	0.654
		(0.081)		
Education-Hi-tech Interactions (Baseline: Not Hi-tech)				
Post-HS, no BA degree#HighTech	1.750	0.560***	1.461	2.097
		(0.092)		
College Degree#HighTech	1.424	0.354***	1.160	1.749
		(0.105)		
Graduate experience, degree#HighTech	2.403	0.877***	1.962	2.944
		(0.103)		
Gender (Baseline: Male)				
Female	0.853	-0.158***	0.809	0.9
		(0.027)		
Work Experience (Baseline: No work Experience)				
Have work Experience	1.612	0.478***	1.201	2.165
		(0.150)		
Team Size (Baseline: One owner)				
Two owners/team members	1.231	0.208***	1.165	1.301
		(0.028)		
Three owners/team members	0.853	-0.140**	0.771	0.98
		(0.061)		
Four owners/team members	1.262	0.233***	1.111	1.434
		(0.065)		
Five or more owners/team members	2.645	0.973***	2.292	3.052
		(0.073)		
Business Idea (Baseline: No Business Idea)				
Business Idea	1.071	0.068**	1.0000	1.146
		(0.035)		
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)				
Entrepreneurial Desire (had entrepreneurial desire)	1.098	0.094***	1.034	1.166
		(0.031)		
Time Devotion (Baseline: Not F/T)				
Full Time Basis	1.007	0.007***	1.006	1.008
		(0.000)		
Project (Baseline: PSED II)				
US PSED I	1.424	0.353***	1.345	1.507
		(0.029)		
Observations		39,360		
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Hypothesis 1(c) predicts that the positive effect of higher education on profitable start-up duration will be amplified for hi-tech start-ups. Results from Model 3 (competing risk, interactions model), the direct effect of my survival reference point is positive and significant (0.88; p<0.01). The sub-hazard for post-graduate education (SHR = 2.403) also provides support that individuals with higher educational attainment in a hi-tech start-up initiative have an increased incidence of establishing a profitable start-up in a shorter duration. Accounting for sampling variability, the increase in subhazard (risk) for nascent entrepreneurs with graduate experience/degree in a hi-tech venture could be as large as 194% or as small as 96% (95%CI for subhazard ratio 1.967-2.939). This partly supports my H4 because my results have shown non-linear outcomes, whereby individuals with post-high school qualifications are also more likely to create hi-tech ventures in a shorter time duration than the founders with a college degree.

An interesting observation can be seen from the competing risks graphs below that for hi-tech start-ups it is only the graduate experience/degree that shows a higher cumulative incidence of duration to profit for start-ups when interacting with hi-tech start-ups. All the other three qualification levels, actually have a higher cumulative incidence of duration to profit for a start-up with the start-up type being non-hi-tech.

Figure 2.8 Comparative cumulative incidence functions (up to HS Degree - Hi-tech interaction)

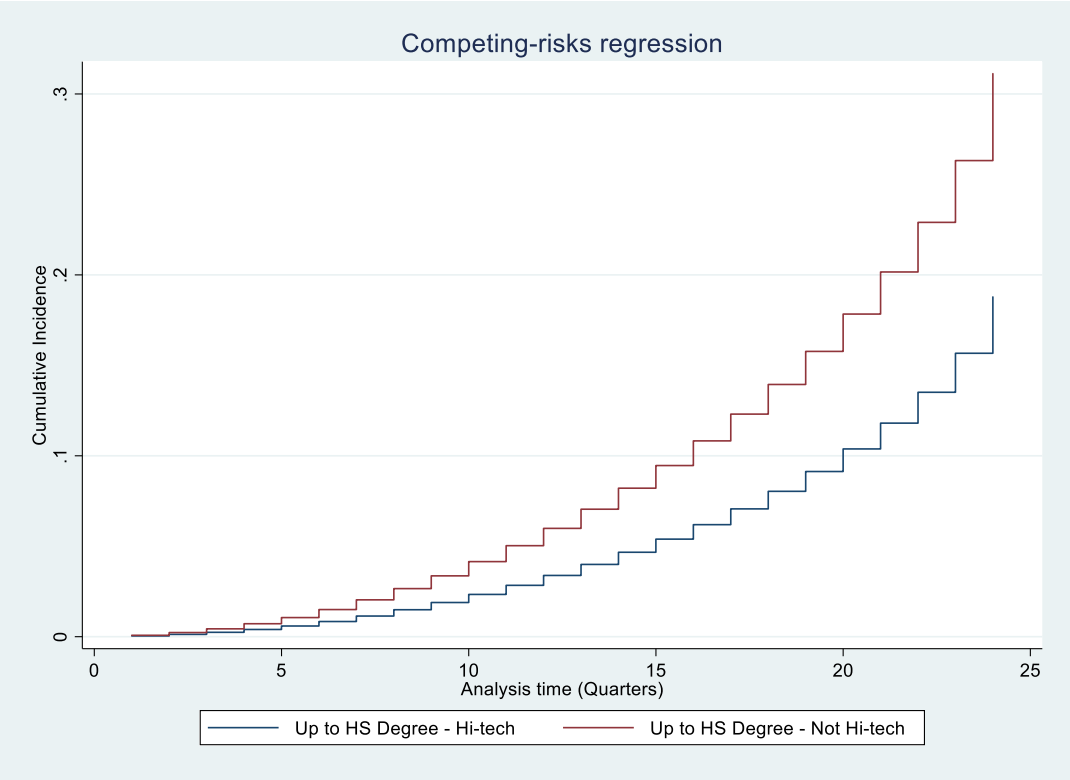


Figure 2.9 Comparative cumulative incidence functions (Post HS - Hi-tech interaction)

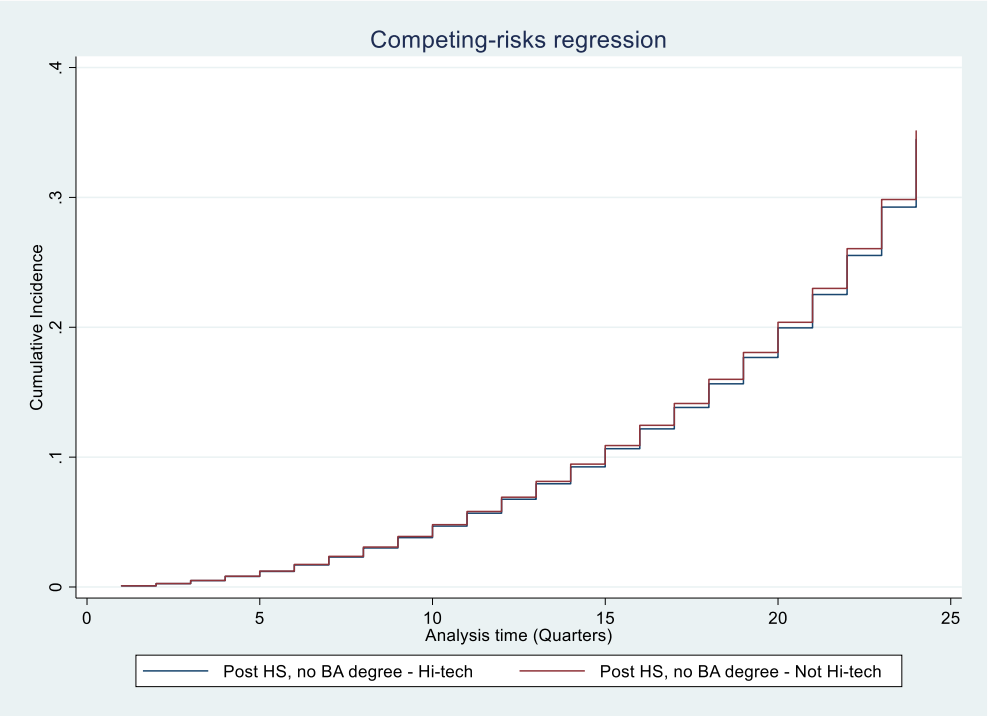


Figure 2.10 Comparative cumulative incidence functions (College Degree - Hi-tech interaction)

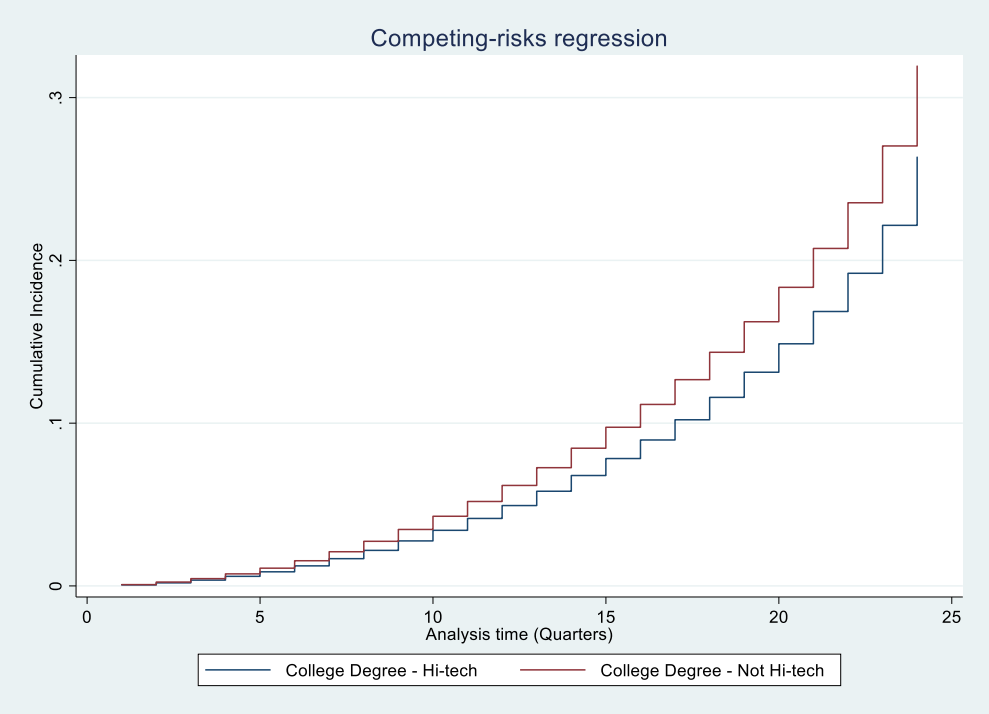


Figure 2.11 Comparative cumulative incidence functions (up to Graduate Degree - Hi-tech interaction)

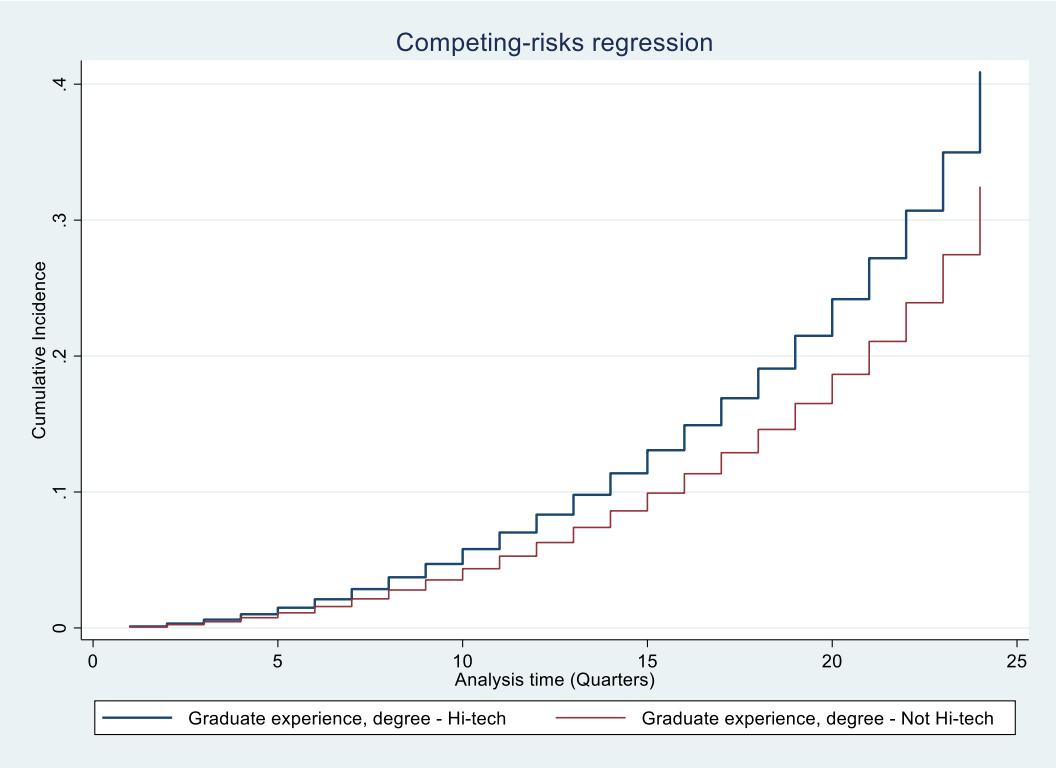


Table 2.6 Age Groups Model

VARIABLES	(4) - Profit (competing with Quit) SHR (Profit)	Competing Risk	95% Conf. Interval	
Educational Attainment (Baseline: Up to HS degree)				
Post-HS, no BA degree	1.303	0.265***	1.212	1.400
		(0.037)		
College Degree	1.093	0.089**	1.007	1.187
		(0.042)		
Graduate experience, degree	1.325	0.281***	1.212	1.448
		(0.045)		
Startup Experience (Baseline: No StartupExp)				
Have Startup Experience	1.143	0.134***	1.084	1.206
		(0.027)		
Industry Experience (Baseline: No IndustryExp)				
Have Industry Experience	1.112	0.107***	1.045	1.185
		(0.032)		
Age Groups (Baseline: 18-36yrs)				
37-55yrs	0.968	-0.032	0.912	1.028
		(0.031)		
56-74yrs	1.137	0.128***	1.046	1.236
		(0.043)		
Sector (Baseline: Non-hi-tech)				
High-tech	0.915	-0.088***	0.865	0.969
		(0.029)		
Gender (Baseline: Male)				
Female	0.859	-0.152***	0.814	0.906
		(0.027)		
Work Experience (Baseline: No work Experience)				
Have work Experience	1.662	0.508***	1.245	2.220
		(0.148)		
Team Size (Baseline: One owner)				
Two owners/team members	1.219	0.198***	1.154	1.288
		(0.028)		
Three owners/team members	0.841	-0.173***	0.746	0.949
		(0.061)		
Four owners/team members	1.272	0.240***	1.121	1.442
		(0.064)		
Five or more owners/team members	2.595	0.953***	2.253	2.988
		(0.072)		
Business Idea (Baseline: No Business Idea)				
Business Idea	1.072	0.070**	1.002	1.148
		(0.035)		
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)				
Entrepreneurial Desire (had entrepreneurial desire)	1.097	0.092***	1.032	1.165
		(0.031)		
Time Devotion (Baseline: Not F/T)				
Full Time Basis	1.007	0.007***	1.007	1.008
		(0.000)		
Project (Baseline: PSED II)				
US PSED I	1.419	0.350***	1.340	1.503
		(0.029)		
Observations		39,360		
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Hypothesis 3 predicts that the duration to profit for start-ups will be shorter for older and younger entrepreneurs. The continuous (i.e. model 1 and 2) model didn't give much clarity on the impact of age on the likelihood of establishing a profitable venture in a shorter duration of time. However, this (categorical model 4) model, has shown a positive and significant (0.13, $p<0.01$) effect of age for the age group of 56-74 in terms of an early likelihood of a profitable outcome, when compared to both the middle-aged and the baseline group (i.e. 18-36years old). Hypothesis 3 also predicts that the duration to profit for start-ups will be shorter for younger entrepreneurs. From model 4, the youngest group is the baseline 18-36 years old group, and it can be seen that the middle-aged group has a lower sub-hazard (SHR=0.968) and the results were not significant. This would mean the younger group is also more likely to create profitable ventures in a shorter duration of time, I would therefore accept H3. The sub-hazard for the 56-74yrs group (SHR = 1.137) also provides support that individuals in this age group have an increased incidence of establishing a profitable start-up in a shorter duration. The increase in subhazard (risk) could be as large as 24% or as small as 5% (95%CI for subhazard ratio 1.046-1.236). In the PSED datasets, middle-aged groups (both men and women) were found to have a higher participation rate in the business creation process (Reynolds, 2018) and I have therefore created three age groups for my modelling. Age grouping into three is also common in other studies on entrepreneurs' age (Brieger *et al.*, 2021). Moreover, other studies have also suggested similar measures: approximately under 40 years (early-career stage), approximately 40-50 years (mid-career stage), and over 50 years (late-career stage) (Bau *et al.*, 2016; Gibson, 2003).

The competing risks graphs on the next page show the older group (56-74 years) show the highest cumulative incidence of duration to profit for start-up, followed by the younger group (37-55 years).

Figure 2.12 Comparative cumulative incidence functions (Age Groups)

Robustness checks

Competing risks survival analysis has been used as an alternative model specification (Yli-renko, Denoo and Janakiraman, 2020), and this study focuses on the survival time to a profitable outcome, taking into account, more explicitly, the other possibility (i.e. exit) available to the nascent entrepreneurs. Moreover, the longitudinal research design has ensured that the data is robust and reliable.

2.5 Discussion and Implications

This empirical study contributes to human capital theory (Becker, 1964), by incorporating competing risks involved in the entrepreneurial process, demonstrating that prior entrepreneurial experiences and prior industry experience of nascent entrepreneurs shorten the start-up duration for profitable venture creation. Moreover, both young and older nascent entrepreneurs have a significant advantage, over middle-aged nascent entrepreneurs, in terms of creating a profitable venture out of the entrepreneurial process, in a shorter period. In regards to education level, I have found an interesting pattern (non-linear) on the duration to a profitable outcome, including for hi-tech ventures. Although both post-high school qualification and a graduate degree speed up the launch of a profitable venture more than a college degree, a graduate degree has the highest likelihood of a shorter duration to a

profitable outcome, particularly for hi-tech start-ups. My study has clarified the predictive power of human capital in terms of duration to profitable new venture creation, particularly from the founder's educational background and for the hi-tech sector. By doing so, I removed the lack of clarity on the role education plays in start-up success (Nielsen and Sarasvathy, 2016), in terms of observable productivity (i.e. a profitable venture creation in a shorter duration of time). Moreover, the more is better belief, when it comes to education (human capital theory), has been clarified.

These empirical findings shed new light on the role of the key human capital element, formal education, age, and prior experience as argued by (Parker, 2018a) in the duration of a profitable outcome of the entrepreneurial process. First, the data suggest a non-linear relationship between education and the duration to profitable new venture creation, suggesting that the relationship is more complex. I would like to add here that the post-high school (pre-college) group is the largest (37% of total NEs) in the PSED dataset who enter entrepreneurial process. Formal education does lead individuals to entrepreneurial careers (Walter and Dohse, 2012) but the profitable outcome and shorter duration are not guaranteed at all educational levels. This suggests that though formal education benefits entrepreneurial judgment from the perspective of developing analytical skills, market know-how, and the entrepreneurial process (Casson, 2003), it does not necessarily mean that it is just the number of years of formal education that matters. For instance, Zaleski (2011) found that all educational levels (i.e. high school graduates, college graduates, and doctorate/professionals) have an equal chance of securing external financing and that educational qualification should not be a barrier to venture creation.

My findings on educational attainment levels are also in line with arguments that high school education equips individuals with basic start-up skills and training and a college degree mainly adds to individuals' managerial abilities (Sobel and King, 2008). However, further research is also required on experiential learning that may compensate for lower educational attainment levels among individuals.

Second, concerning the higher educational level and its effect on the entrepreneurial outcome, my study has clearly shown how hi-tech ventures are the top beneficiary of the founder's higher educational attainment. Moreover, my study has contributed to the need of incorporating time into entrepreneurial research (Lévesque and Stephan, 2020) and provides evidence on how technology intensity and innovativeness may impact not only the prospects of venture creation (Brinckmann and Kim, 2015; Khan, Tang and Joshi, 2014; Hechavarria, Renko and Matthews, 2012) but also the duration to a successful outcome based on NEs' human capital. The educational experience of hi-tech entrepreneurs provides them with

better legitimacy and diffuses the investors' perceptions regarding the likelihood of an exit (Di Paola *et al.*, 2018) and the homophily effect (i.e. acquaintances from academic institutions) fosters entrepreneurial rates (Kacperczyk, 2012). My study has also empirically demonstrated how the interaction between different education levels (general human capital) and industry types (hi-tech/non-hi-tech) influences the duration and the outcomes of the entrepreneurial process. These findings, when seen with statistics that only 6% of high school diploma holders or leavers end up starting tech companies in the U.S. (Wadhwa, Freeman and Rissing, 2008), provide clear support for higher educational attainment and its value for launching a profitable hi-tech venture in a shorter period.

Third, it has provided empirical evidence of a positive link between entrepreneurial experience and profitable venture outcome in a shorter duration, as opposed to the mixed results from past studies on entrepreneurial experience and venture survival (Delmar and Shane, 2006; Gimeno *et al.*, 1997). Furthermore, prior start-up experience helps founders to maintain a realistic view of the challenges involved in venture growth (Capelleras *et al.*, 2019) and that serial entrepreneur can benefit from the skills acquired during their previous new venture creation (Dimov, 2010) that can be helpful in a speedier profitable new venture creation. My findings also fit into the argument by Parker (2018) that individuals may benefit from their experiences on how enterprises work in reality, and how experience can skill individuals to exploit opportunities (Shane, 2004).

Fourth, a significant relationship between industry experience and shorter duration to a profitable outcome has removed arguments on lack of evidence on how industry experience contributes toward a successful venture creation (Dimov, 2010). This supports arguments that prior industry experience helps maintain a realistic view of the challenges involved in venture growth (Capelleras *et al.*, 2019) and that industry insight provides a duration advantage as well, with the founder being more prepared and realistic about the venture being pursued.

Finally, a non-linear relationship between a founder's age and the shorter duration to a profitable start-up provides some support to the argument that the founder's age is a key predictor of entrepreneurial success (Azoulay *et al.*, 2020) or entrepreneurial outcomes (Edelman and Yli-Renko, 2010; Shook, Priem and Mcgee, 2003). My findings are opposite to previous studies showing that the relationship between age and survival (length) in the entrepreneurial journey seems to be curvilinear (Block and Sandner, 2009) with higher success rates among middle-aged individuals and above (Azoulay *et al.*, 2020). This is important because being successful is one thing and being early in achieving profitability is another. Concerning the older (56-74) age group, showing stronger results than the

predecessor age group (37-55), it can be argued that older individuals benefit from their savings and pension enabling them to wait and pursue suitable business opportunities as and when they emerge (Piekkola and Leijola, 2007) and that near the retirement age, entrepreneurship motivation can be driven by the need for self-fulfilment and to remain active while ageing (Gimmon and Hantman, 2018).

This research has important implications for practitioners. First, the results help to clarify how higher educational attainment, previous start-up experience, and prior industry experience increase the likelihood of crossing the entrepreneurial process finish line quicker and successfully, which is a profitable start-up being created, and how nascent entrepreneurs of particular age groups benefit relatively more when it comes to launching a profitable new venture in a shorter duration of time.

This research will also help the policymakers in adapting policies for efficient resource allocation based on individuals' general and specific human capital and based on industry type. As previous research has shown that increased investment in human capital facilitates technological progress and economic growth (Diebolt and Hippe, 2019), therefore, this study will help policymakers in setting appropriate duration targets aimed to promote successful venture creation, including hi-tech start-ups, leading toward economic growth.

2.5.1 Limitations and outlook (directions for future research)

I have provided better insights into the entrepreneurial process duration by studying the relationships between the founder's general and specific human capital, and the duration to a profitable outcome. Having said that this study is not without limitations. First, my study focuses on human capital factors of individual nascent entrepreneurs, acting as a single founder or a member of the founding team, and although team size has been used as a control, there is a possibility that team human capital affects the results of my study. However, a single respondent-level focus has been adopted in other PSED-based studies (Markowska *et al.*, 2019). Second, the harmonized PSED only includes gestation activities that appear in both of the original data sets, which can result in some underestimation of process duration (Shim and Davidsson, 2018). However, despite the limitations, this study is believed to be a correct description of the duration estimates, in context to the human capital indicators, for the majority of nascent entrepreneurs involved in the entrepreneurial process. Third, entrepreneurship involves individual entrepreneurs and social interactions (Markowska *et al.*, 2019), and my study has not accounted for any direct effect of the social network due to data limitations as well as to study the direct effects of human capital factors. Further extension of this study could be based on investigating the influence of regional contexts on new

venture creation duration (Raffiee and Feng, 2014), particularly when the national culture can result in different risk propensities and performance orientations among individuals (Wennberg, Pathak and Autio, 2013).

2.6 Conclusion

By adopting a temporal lens to better understand the 'human capital-venture type-profitable venture creation' relationships, within the entrepreneurial process, my study has provided a better and holistic insight into the contingent nature and relationships of human capital factors and their impact on the duration of a profitable outcome. The study has four contributions to the field of entrepreneurial process duration research from a human capital perspective.

Firstly, I have detangled the general and specific human capital factors' effect on entrepreneurial process outcome, in a very specific and clear observable way (i.e. a profitable venture creation). By doing so, I have provided a more realistic predictive power of the human capital theory in terms of the entrepreneurial process duration domain, which has empirically shown how the founder's specific human capital factors (i.e. prior start-up and industry experience) provide a clear advantage duration and commercial (i.e. profitability) advantage to nascent entrepreneurs. Concerning education level and duration to a profitable outcome, the human capital theory fell a bit short to explain why there is no linear relationship and opens up the opportunity for further theorisation. In terms of age, my empirical findings (nonlinear relationship) have also provided better insight into the age and duration to profitable venture creation relationships. This is important because most of the studies on the entrepreneurial process were focused on entrepreneurial entry or survival and showed inverted U-shaped relationships.

Secondly, my methodological contributions involve bringing in a competing risks model in addition to the standard Cox model for a more realistic assessment of the impact of human capital factors on the duration to a profitable outcome, while accounting for the other risk (i.e. founder disengaging from the process).

Thirdly, by bringing in discussion on general human capital (education) and industry type (hi-tech start-ups) I have helped clarify how the general perception of more is better in terms of human capital aspect does not hold for all levels of education levels.

Finally, and most important of all, is that I have attempted to introduce both duration and a positive (profitable outcome) discussion in the nascent entrepreneurship studies. By doing so I have theorised how different types of founder human capital factors, and age, impact the duration of profitable new venture creation, including hi-tech ventures.

These findings are relevant for entrepreneurs seeking to estimate and decide, based on their human capital resources, on the possibility and duration of a profitable outcome from their initiative. The findings will also be useful for academics who advise aspiring entrepreneurs (students) in relevant human capital investments and to enter the entrepreneurial process by having a pragmatic approach towards personal and industry (hi-tech and non-hi-tech) audit. It is hoped that the insights presented in this study will stimulate research interest in studying the entrepreneurial process from the duration perspective by introducing advanced modelling to establish the real impact of human capital factors in successful take-off (i.e. profitable start-ups being created).

Chapter 3: Leaving the Entrepreneurial Process: How Human Capital and Age Affect Duration to Nascent Entrepreneur's Exit

Abstract

Research on the founder-level exit has been gaining momentum but it has mostly remained focused on post-venture formation exit. One challenge has been the lack of theory and measures that can capture the different dimensions behind the founder's exit. This chapter examines the role of human capital and age in an entrepreneur's propensity to exit the entrepreneurial process. The chapter posits that higher human capital and the older age of nascent entrepreneurs may delay entrepreneurial exit. This chapter argues that a dual mechanism is in place, being the human capital that supports venture formation on the one hand, on the other, the founder's post-entry learning of their initial idea's viability aided by their human capital that makes them efficiently decide on exit option. By using longitudinal data (harmonised PSED dataset – US cohorts), modelling for competing risks and interaction effects, and focusing on pre-entry dynamics of nascent entrepreneurs, the results show that the direct impact of human capital on an individual's persistence (i.e. not quitting earlier into the process) during the entrepreneurial process is significant, and the interactions between general and specific human capital also make founders' exit less likely in a shorter period of time. Theoretical and practical implications of the results are discussed.

Keywords: Entrepreneurial Exit, Human Capital, Duration Analysis, Entrepreneurial Process

3.1 Introduction

Research focus has largely remained on an individual's decision to enter the venture creation process and not on how an individual's characteristics relate to entrepreneurial exit decisions (Kerr, Kerr and Xu, 2017), even when new venture initiatives are exposed to high risk of infant exit (Cefis *et al.*, 2021); around half of the new ventures initiatives cease during the entrepreneurial process (Hammer, 2019; Cueto, Suárez and Mayor, 2020); and at least half of all nascent ventures never reach a stage where they can recoup their start-up costs (Parker and Belghitar, 2006). In other words, most nascent entrepreneurs do not succeed in launching their ventures and decisions to exit the entrepreneurial process are a frequent phenomenon (Lukeš and Zouhar, 2016). Therefore, founder-level research on exit decisions would help in identifying factors that contribute toward founder exit (Strese *et al.*, 2018), and by studying duration to exit, we can also have a better insight into how those factors impact the likelihood and duration to exit (Aldrich, 2015).

Why do some nascent entrepreneurs who enter the entrepreneurial process choose to quit, much earlier than others? Can venture survival be explained through the founder's pre-entry human capital and age? Some attempts have been made to answer these questions (Tietz, Lejarraga and Pindard-lejarraga, 2021; Xi *et al.*, 2020; Yusuf, 2012) but remained rather inconclusive. An issue is that survival and exit determinants may differ (Wennberg *et al.*, 2010; Xi *et al.*, 2020) and therefore findings of survival may not be an accurate estimation of the founder's exit. Second, the focus on the founder's voluntary exit has remained rather rare (Xi *et al.*, 2020).

Entrepreneurial exit not only impacts the entrepreneur (Eklund, Levratto and Ramello, 2020) but also the industry, market, and economy (DeTienne, McKelvie and Chandler, 2015; DeTienne, 2010), and the actual total costs of entrepreneurial exits are usually misjudged because nascent entrepreneurs' disengagement is not usually accounted for as most of the researchers have focused on the exit of established firms, which is different to nascent entrepreneurs' exit (Wicker and Davidsson, 2015). Furthermore, entrepreneurial exit has traditionally been studied from a societal-level perspective that had regarded exit as a failure and just considered an organisational mortality rate (Lee and Cho, 2020). However, many exits could be due to individuals deciding to stop pursuing unviable ideas based on the associated opportunity costs and hence should be categorised as successes (Coad, 2014) being an intelligent exit decision (Camuffo et al., 2020). It has therefore been argued that disbanding a start-up in a timely manner and at a reasonable cost, should be considered a positive outcome of the start-up efforts (Yusuf, 2012) and that any unnecessary entrepreneurial persistence could potentially have negative effects in terms of hanging on to

poor ideas (Davidsson, 2006). However, the time investment, and other types of sunk costs that are involved in the process, could make entrepreneurs delay entrepreneurial exit (Yamakawa and Cardon, 2017), e.g. buying time for emotional recovery, yet that might have further financial consequences (Shepherd, Wiklund and Haynie, 2009).

Another issue is that exit, is an important part of the entrepreneurial process (Rouse, 2016), although it has been analysed both from the theoretical and empirical perspective, these have mostly considered the firm-level perspective (Cefis *et al.*, 2021; Cefis *et al.*, 2020; Coad, Frankish and Storey, 2020; Coad *et al.*, 2013), including time to firm's exit (Elfenbein and Knott, 2015). Moreover, the venture exit decision has been considered the flip side of venture persistence (Zhu *et al.*, 2018) in presence of start-up challenges and other available alternatives (Holland and Shepherd, 2013).

Research on human capital and founder's exit has argued the importance of human capital in a founder's exit decision but has remained inconclusive. Lower human capital (e.g. work and industry experience) has been associated with the founder's voluntary exit (disengagement) earlier into the venture creation process, due to opting for alternative employment opportunities as well as exiting due to lower market response (Parastuty *et al.*, 2016). On the contrary, Toft-Kehler, Wennberg and Kim (2016a) have suggested that both novice and highly experienced founders are more likely to continue with their venture creation process, hence suggesting they would not exit early. In this chapter, I have therefore attempted to clarify the role founder's human capital play in the likelihood and duration to exit.

Founder exit decisions are linked to their opportunity cost assessments and availability of career alternatives (DeTienne, McKelvie and Chandler, 2015a), being a rational economic choice (Hessels *et al.*, 2018). Particularly from the perspective of the opportunity cost, continuing with a start-up initiative may not be a rational decision provided there are better alternatives like employment in an established firm (Nielsen and Sarasvathy, 2018). This is particularly important because founders with higher human capital may be able to quickly learn about the viability of their start-up (Jovanovic, 1982) and would be able to make timely decisions to disengage. Moreover, even when the founder's human capital (educational attainment, prior start-up experience) and age have been considered to study exit, they were used as control variables for the firms' survival studies (Coad, Frankish and Storey, 2020) or lacked certain founder's human capital (e.g. prior start-up experience) information in their analyses, and were mentioned as research limitations (Pe'er, Vertinsky and Keil, 2016). In this chapter, I have therefore chosen to focus on both general and specific human capital factors, the likelihood and duration until a founder's exit from the entrepreneurial process by empirically studying the direct effect of the founder's human capital factors, as well as the interactions

effect of different types of human capital. I believe that testing the impact of a variety of human capital factors and how they impact duration to founder's exit is important because research has suggested that diversity of human capital factors influence founders' exit decisions (DeTienne and Cardon, 2006). It will also show which of the founders' human capital factors make reluctant to disengage, continue to operationalise venture creation efforts, or efficient at making disengagement (smart) decisions, driven by the application of human capital and learning from the process.

Furthermore, higher human capital has also been considered a factor in early exit because it presents more alternate employment opportunities to individuals, making them more prone to exit (Siepel, Cowling and Coad, 2017). Given a higher (55%) disengagement rate among founders within the six months (PSED period of tracking transition), those founders with higher human capital (each human capital factor on its own) are more likely to quit (Reynolds, 2018), it is important to study correlation/complementarities between human capital factors and entrepreneurial exit and how it may affect duration to exit. I also expect that such analyses will provide a better understanding of the application of multiple human capital factors and how they can help founders not only apply them to drive better results but also to make an efficient decision around the timing of disengagement (Jovanovic, 1982), to avoid negative personal and societal costs. Moreover, such founders' behaviour (i.e. a timely voluntary exit) can provide better insight into positive exit externalities (Parker, 2018a), whereby, other nascent entrepreneurs can learn about the capacity and possibilities from their human capital factors in terms of being realistic on the outcome (incl. exit) and duration perspective.

As explained in Chapter 2, the human capital theory by Becker (1964) has played a key role in entrepreneurial process research and has helped researchers to distinguish between general and specific human capital (Canavati *et al.*, 2021). The human capital theory can also provide a good theoretical ground to test the duration (time) to entrepreneurial exit particularly when optimal exit time remains an important concern for entrepreneurs and also when not much clarity is available on individual factors behind individuals' exit from the entrepreneurial process (Elfenbein, Knott and Croson, 2017). The human capital theory would therefore provide a strong theoretical base for this chapter in studying the impact of a founder's human capital on the duration to entrepreneurial exit. By doing so, I have also attempted not to only check the predictive power of the human capital theory but I have also attempted to introduce and suggest that research on founder exit should incorporate the duration perspective in future theory development.

Evidence on human capital effectiveness in terms of entrepreneurial performance remains mixed (Brixiov, Kangoye and Said, 2020; Hogendoorn *et al.*, 2019). Entrepreneurship studies

on human capital have attempted to explore the importance of different types of human capital but have not necessarily managed to identify which of those is more transferable to provide founders with a competitive advantage during the entrepreneurial process (Wright and Mcmahan, 2011). Moreover, the 'more is better' assumption, which is simply aggregating different types of individual's human capital (e.g. education and experiences), has been mostly used as an approach (Ployhart and Moliterno, 2011). This has left out studying interaction effects and possible complementarities or trade-offs between the founder's general-specific human capital of venture outcome, and therefore suggestions have been made to investigate the combined effect of different human capital factors (Ratzinger *et al.*, 2018).

Human capital has also been argued to be an age-related mechanism, and thus the need to study the founder's age and venture outcome relationship has been identified (Zhao *et al.*, 2021). A founder's age also represents generic human capital (DeTienne and Cardon, 2006), partly because work experience accumulates with age (Honjo, 2021). An individual's age has also been linked to entrepreneurial exit and younger entrepreneurs are found to be more likely to exit than senior entrepreneurs, which can be explained by a lack of experience and resources in the former group (Xi *et al.*, 2020). It has therefore been suggested that a better understanding of what makes individuals exit the entrepreneurial process may lead to finding empirical patterns associated with the venture creation process (Hoang and Gimeno, 2010). Given that age is a confounder of human capital, I have attempted to clarify the effects of age on the likelihood of and duration to the founder's exit. Through the overall enquiry of this chapter, I would attempt to fill the gap in founder exit studies that have largely overlooked a founder's voluntary exit and/or projected an exit as a rather unwelcome outcome (Xi *et al.*, 2020). The founder-level exit studies are also rare as mostly firm-level exit has largely been studied (Cefis *et al.*, 2021; Cefis *et al.*, 2020; Coad, Frankish and Storey, 2020; Coad *et al.*, 2013). The firm-level focus has also undermined the importance of the founder's exit in the entrepreneurial process studies (Rouse, 2016) and has also lacked a time-based perspective (Guerrero, Liñán and Cáceres-Carrasco, 2020) to exit research that does not necessarily pre-label exit as a negative outcome.

This chapter's research question is what effect the founder's human capital and age have on the nascent entrepreneur's duration to exit. I have explored the above questions using human capital theory (Becker, 1964) and Jovanovic's model (1982) to explore how human capital factors, their interactions, and age impact duration and the likelihood of a founder's exit. The use of more than one theory/model has been present in founder exit studies, for example, (Wennberg *et al.*, 2010) combined human capital theory and prospect theory to develop a theoretical framework for different exit routes based on venture performance. DeTienne and

Cardon (2012) used the theory of planned behaviour and threshold theory to explore the relationship between the founder's human capital and exit routes.

Human capital theory (Becker, 1964) posits that individuals' higher or more human capital enhances venture survival (Dimov and Shepherd, 2005). Jovanovic Model (1982) posit that founders learn about their abilities only once they enter the process and then based on their assessment of venture viability, decide to continue or quit. I am therefore using both of these (theory and model) to establish the predictive power of human capital theory in terms of the duration to the founder's exit. On the one hand, human capital can help these founders to be good at transferring their learning to the venture creation process and therefore less likely to exit earlier, and on the other, a quick assessment of venture viability by these founders after entering the process (i.e. Jovanovic's model) can impact duration to their exit decision.

I have four contributions to the field of entrepreneurial exit. Firstly, by drawing on the Human Capital theory (Becker, 1964), I demonstrate that a nascent entrepreneur's higher educational attainment, work experience and prior industry experience reduce the hazard rate for an early exit, which adds to the predictive power of the human capital theory in terms of lower risk of an early founder's exit. Secondly, from the theoretical point of view, I have shown how a founder's pre-entry human capital delays the duration to exit, helping these founders to efficiently voluntarily decide to disengage from the entrepreneurial process, minimising both personal and societal costs. Moreover, older founders are less likely to exit in a shorter duration, showing two effects in action again. Firstly, would have fewer external employment opportunities and secondly, they would benefit from the accumulated experience that will deter chances of an early exit. Thirdly, the methodological contribution in terms of the use of longitudinal research design (Hanage *et al.*, 2021) and accounting for the competing risks (i.e. the possibility of a profitable outcome). Finally, I have provided a better insight into the contingent nature and relationships of human capital factors and age, whereby a dual mechanism appears to drive the founder's exit decisions. From a human capital perspective, higher human capital delays the likelihood of an early exit, except for prior start-up experience. However, founders with higher educational attainment and prior start-up experience tend to delay the likelihood of an exit. In terms of prior work experience, both prior industry and prior start-up experiences have a greater complementary impact.

3.2 Literature Review and hypothesis development

DeTienne and Wennberg (2016) have highlighted the need for time-oriented exit studies but they mainly argued for profitable entrepreneurial exits because long-time horizon to exit can

deter future investment (e.g. angel investment) in start-ups. Guerrero, Liñán and Cáceres-Carrasco (2020) have also highlighted the need for dynamic analysis in future entrepreneurship research that incorporates a time-based perspective across the entrepreneurial process benefitting from longitudinal studies, also considering the exit possibilities. In summary, I have attempted to enhance the human capital literature by also investigating interaction effects on how different types of human capital shapes the entrepreneurial process outcome in terms of the likelihood and duration of the founder's exit.

Human Capital Theory

Detailed discussion on the human capital theory and its use for studying the relationship between general (e.g. education) and specific (e.g. experience) with the venture process outcome due to individuals' assessment of their opportunity costs (Markowska *et al.*, 2019) has been provided in Chapter 2. From the founder's exit perspective, higher levels of founder human capital increase the probability of them abandoning the entrepreneurial process when faced with challenges e.g. industry crises (Colombo and Grilli, 2017). Attempts have also been made to distinguish between voluntary and involuntary exit (Bhawe, Gupta and Pollack, 2017) as founders can exit due to better alternatives, available to them because of their human capital, or due to poor performance (Boeker and Karichalil, 2002). The human capital theory would therefore complement research on venture founding/creation by empirically studying the role of human capital and exit in the entrepreneurial process (Wennberg and DeTienne, 2014; DeTienne, 2010).

Jovanovic Model

Jovanovic Model (1982) is a model of passive learning in entrepreneurship (Parker, 2018a), which suggests that founders enter the entrepreneurial process with considerable uncertainty regarding their abilities, and by the passage of time only, they receive feedback on their abilities (Townsend, Busenitz and Arthurs, 2010). Jovanovic's work has argued that individual makes an entrepreneurial choice based on the perceived advantage of his/her skills, and upon pursuing an opportunity they come to know about their competitiveness and the likelihood of venture creation (Minniti *et al.*, 2019). From the human capital interactions' perspective, I believe that testing both the Jovanovic and human capital theory with regards to duration to founder exit would shed some new insights, particularly when it has been argued that there is a lack of theory and measures in studying founder level and venture outcomes (Strese *et al.*, 2018).

Human Capital

Entrepreneur's human capital is an important resource in entrepreneurship (Oberschachtsiek, 2012), which includes formal education and experience (Hayter *et al.*, 2018) and entrepreneurs' human capital (i.e. educational attainment, work experience, prior entrepreneurial experience, and industry experience) and age, as part of the general human capital, has been linked to entrepreneurial exit decision (DeTienne and Cardon, 2012). An important distinction around general and specific human capital made by Rauch and Rijsdijk (2013) is around the difference in opportunity costs involved for decisions made by entrepreneurs with different types of human capital, whereby general human capital has more opportunity cost involved because of alternate employment opportunities, which are restricted for the industry-specific experience. Capelleras *et al.* (2019) have also argued that experienced entrepreneurs have relatively lower opportunity costs than individuals with higher educational attainment, and because experienced entrepreneurs have vital first-hand information concerning the challenges and new venture prospects. However, industry experience provides better market-related understanding through due diligence to assess the benefits and risk assessment for planned ventures (Gabrielsson and Politis, 2012). Moreover, industry experience incorporates observation and learning curve benefits, which should speed up new venture creation (Schoonhoven, Eisenhardt and Lyman, 1990).

It is also important to note here that although many studies have assumed that more human capital is better for venture creation, some researchers have highlighted the possible 'dark side' to human capital (e.g. specific prior knowledge) as it can negatively impact venture creation process by not only hindering opportunity discovery process but also impacting exploiting innovation (Marvel, Wolfe and Kuratko, 2020; Marvel, Davis and Sproul, 2016; Gruber, Macmillan and Thompson, 2013). Another aspect I would like to highlight here is that while the work experience was considered as a control in Chapter 2 which focuses on the duration to a profitable outcome, in this chapter the mechanism is different due to the role prior work experience plays in the founder's exit considerations, which are not specific to financial performance only (Mathisen *et al.*, 2021). Individuals with prior work experience also tend to invest more time in environmental scanning (e.g. evaluating alternate employment opportunities), particularly in the earlier phases, and hence have a different attitude towards the entrepreneurial exit that may also impact the timing of exit (Huvaj, 2020). Moreover, the market recruiters also tend to prefer individuals with prior work experience that have decided to exit the entrepreneurial process and are ready to transition back to waged employment as they would likely have low retention issues after their entrepreneurial adventure (Waddingham, Zachary and Walker, 2022). It has also been found that founders with prior work experience tend to be more conscious about disruption in their careers and how the

market for paid employment would see them even if they eventually manage to create a low growth-oriented new venture (Merida and Rocha, 2021), and that may again impact their exit considerations and the timing of exit.

Hypothesis development

Educational attainment has also been linked to the type of entrepreneurial exit in terms of it being a planned or a reactive exit. Yusuf (2012) referred to an intelligent exit that is a proactive and strategic disengagement by educated entrepreneurs being efficient at opportunity assessment in terms of the likelihood of its success. Yusuf (2012) also referred to the reactive or uninformed disengagement by entrepreneurs with lower educational attainment as they lack planning and problem-solving skills resulting in abrupt disengagement by the nascent entrepreneurs. Individuals with higher educational attainment tend to have higher growth aspirations that are also linked to higher opportunity costs (Capelleras *et al.*, 2019). Research has also found educational attainment to be positively associated with the probability of voluntary exit (Parker, 2018b). Gimeno et al. (1997) found that general human capital helps entrepreneurs to perform better, however, they do not necessarily have better survival rates because they tend to set higher performance benchmarks and might quit if they do not see progress accordingly. Cueto, Suárez and Mayor (2020) do not find a significant effect of a university-level education on venture survival because it opens doors to waged opportunities, and therefore these individuals can choose to exit the entrepreneurial journey for alternate employment.

However, educational attainment provides entrepreneurs with stronger cognitive capacities, which allow them to effectively monitor their progress and make any necessary changes if required (Dencker et al., 2021). Individuals with higher educational attainment are likely to act more scientifically helping them to pursue projects that are more likely to be successful, perform better, and hence decreasing the likelihood of an early exit (Camuffo *et al.*, 2020). Higher educational attainment is found to decrease exit hazards as these individuals have enhanced skills to face venture creation challenges (Rocha, Carneiro and Varum, 2015). Highly educated individuals were also found to be more likely to succeed in their start-up ventures (Cooper, Gimeno-gascón and Woo, 1997) as their higher educational attainment provides them with better problem-solving and decision-making skills during their venture development (Baptista, Karaoz and Mendonca, 2014). This would mean that, most likely, higher educational attainment would lower the likelihood of the founder's exit and even if it happens, the duration to an exit would be longer.

Unger *et al.* (2011) have also argued that formal education help founders with knowledge acquisition and skills development, which also add to the legitimacy of the entrepreneur (Gimmon and Levie, 2010). Higher educational attainment also makes individuals better at picking effective start-up strategies in terms of risk and innovation (Sonfield and Lussier, 2014), which then could help decrease the likelihood of founder exit; see: Gimeno *et al.* (1997). Blume (2019) found that individuals with higher educational attainment are less likely to exit, which could be because higher educational attainment drives higher growth aspirations and in turn a favourable assessment of a new venture's growth opportunities (Capelleras et al., 2019), which can make an earlier exit from venture creation less likely. Educational attainment is believed to assist in acquiring necessary entrepreneurial skills (e.g. basic literacy and/or advanced scientific knowledge) that lead to engagement in entrepreneurial activities (Huffman, 2020; Gieure, Benavides-Espinosa and Roig-Dobón, 2020). Hogendoorn, Groot and Van den Brink (2019) also found that formal education positively affects venture outcomes but the effect on duration remains inconclusive. Similarly, Audretsch, Bönte and Pawan (2013) found higher human capital attainment to lower the exit probability (Rauch and Rijsdijk, 2013). Given that individuals with higher educational attainment would enjoy better legitimacy (Gimmon and Levie, 2010), and would be more competent in ongoing risk assessment and management, strategy and decision-making, I postulate the following hypothesis:

Hypothesis 1a: Nascent entrepreneurs with higher educational attainment are less likely to exit early.

Marvel, Davis and Sproul (2016) found that nearly half (39.9%) of the human capital constructs used work experience to access human capital. However, from the nascent entrepreneurship perspective, work experience based constructs have received less attention (Zapkau, Schwens and Kabst, 2017) and have produced mixed results. Work experience has been found to have a very small positive effect on nascent entrepreneurship activity (Davidsson and Honig, 2003). Previous research has also found no effect of general work experience on entry to the nascent entrepreneurial process (Zapkau *et al.*, 2015; Kim, Aldrich and Keister, 2006) but focus on its effect on entrepreneurial exit remained absent. Gabrielsson and Politis (2012) have argued that "jacks-of-all-trades", individuals with work experience from different areas are generalists and only know little about many things, which I believe could make them more likely to face technical challenges that can result in individual decisions to exit early. Prior work experience may also present individuals with more external employment opportunities which can increase exit probability as employment options could be considered more favourably against a much risker entrepreneurial route (Millán, Congregado and Román, 2012). Oberschachtsiek (2012) found that entrepreneurial duration strongly (positively) relates to work experience but from an entrepreneurial exit perspective, Colombo and Grilli (2017) found

a positive impact of work experience on the likelihood of exit, which could be linked to the higher opportunity cost of remaining in venture process by the individuals with prior work experiences (Rocha, Carneiro and Varum, 2015).

On the other hand, it has been argued that work experience provides individuals with valuable skills (e.g. communication, planning, and organising) and provides better insight into customer and market dynamics (Gabrielsson and Politis, 2012). It has also been argued that work experience enhances entrepreneurs' ability to assess, evaluate and combine resources that benefit them during the entrepreneurial process (Shepherd and Detienne, 2005; Shane, 2000) hence making founders' work experience to be vital for venture survival (Kato and Honjo, 2015; Paik, 2014; Ulvenblad, Berggren and Winborg, 2013). Huggins, Prokop and Thompson (2017) found that work experience increase venture survival rates and work experience have also been found to enhance performance in terms of venture survival (Bosma *et al.*, 2004). General work experience also helps individuals with accumulating a variety of skills in different roles (Krieger, Block and Stuetzer, 2018) including functional skills (Hsieh, 2016) that can help founders with venture creation and hence I believe that will deter exit likelihood as well as the duration of founders exit would be longer. My tentative assumption based on the communication, planning, and organising abilities that general work experience provides an individual, the likelihood of founder exit would be lower and the duration to it would be longer. I therefore posit:

Hypothesis 1b: Nascent entrepreneurs with work experience are less likely to exit early.

Previous entrepreneurial experiences could differ in context and outcome and therefore the impact on the new venture process could be different (Zhao and Smallbone, 2019). Entrepreneurial experience enhances individuals' learning capacity and capabilities, which provide them with an edge to manoeuvre through the complex and challenging nature of the entrepreneurial process (Lafuente *et al.*, 2021). Individuals with prior entrepreneurship experience are also believed to have a better value proposition, a better understanding of customers' needs, target market well than those without entrepreneurial experience (Baron and Ensley, 2006). Prior entrepreneurial experience also provides an advantage of having been through similar phases and helping them to be more realistic with the aspect of time and effort investment (Marvel *et al.*, 2020). Nascent entrepreneurs benefit from their previous entrepreneurial experience (Mamabolo, Kerrin and Kele, 2017), and from the confidence gained through testing their entrepreneurial abilities, and therefore they become less prone to exit their venture journey for any paid employment opportunity (Taylor, 1999). However, entrepreneurial experience has also been found beneficial in enhancing entrepreneurs'

resources and networking with their stakeholders (market actors), helping to establish successful start-ups (Aarstad, Pettersen and Henriksen, 2016).

Oberschachtsiek (2012) found that start-up experience is associated with early exits into employment, whereas, Grilli (2010) found a negative and statistically insignificant impact of entrepreneurial experience on venture exit. Gifford *et al.* (2020) found entrepreneurial experience decreases venture exit probability and hence increases the likelihood of firm survival. Coad *et al.* (2016) also found that prior entrepreneurial experience is not significantly related to the likelihood of exit.

Raffiee and Feng (2014) have argued that prior entrepreneurial experience has resulted in lower exit hazards as serial entrepreneurs benefit from their prior start-up experiences. Entrepreneurial experience also builds critical knowledge through direct learning and provides better acquaintance with the entrepreneurial role (Türk, Zapkau and Schwens, 2020), which can play a key role in venture creation (Sobakinova, Zhou and Durrani, 2020). Lafontaine and Shaw (2016) found that entrepreneurs with prior start-up experience are less (i.e. 7.2% less chance) likely to exit the entrepreneurial process. Based on the benefits that founders drive from their prior entrepreneurial experiences which include efficient networking with key stakeholders, better customer insight, and general flexibility in terms of adaptation, I believe that they will be less likely to exit early. I therefore posit:

Hypothesis 1c: Nascent entrepreneurs with entrepreneurial experience are less likely to exit early.

Carbonara, Tran and Santarelli (2020) have found that individuals with industry experience have twice the exit hazard rate per unit of time than those without any prior industry experience. The reasons are that they are better at evaluating a venture's viability based on market demand and market competition, and hence choosing to exit if the expected outcome is not what they desire. Aldrich (2015) has also found that starting a business without related industry experience is not familiar with industry conditions, and that results in an early exit from the entrepreneurial process.

On the contrary, entrepreneurs with industry experience are more likely to survive (Gifford *et al.*, 2020) benefiting from the information and relationship advantage that nascent entrepreneurs accumulate through industry experience, enabling them to modify or refine the current opportunity in ways that enhance opportunity's feasibility and operability (Dimov, 2010). Prior industry experience is also found to increase individuals' persistence as they give more importance to learning-by-doing and have informational advantages gained through industry experience (Rocha, Carneiro and Varum, 2015). However, survival is a zero outcome,

one of the outcomes of the entrepreneurial process. But research has not provided clarity on the continuous outcome (i.e. duration) within the entrepreneurial process. It has been argued that industry experience can positively affect venture performance and reduce the likelihood of the entrepreneur's exit from the business (Gimeno *et al.*, 1997), however, no clear duration measurement was studied. One reason for the lower likelihood of an early exit could be that founders with industry experience tend to set lower venture performance, which makes them less likely to exit (DeTienne and Cardon, 2012). I, therefore, posit:

Hypothesis 1d: Nascent entrepreneurs with prior industry experience are less likely to exit early.

Entrepreneurship research interest in individuals' age has been gradually rising (Minola, Criaco and Obschonka, 2016) because entrepreneurship, as a career option, is being increasingly considered by individuals of all ages (Zhao *et al.*, 2021). Entrepreneurship has been argued to represent both individual's mindset and behaviours that change over the person's life (Martin, 2020) and therefore research on age and founder's exit has produced mixed results. It has also been argued that age may discriminate positively or negatively against individuals, even for individuals with a similar level of human capital and context (Dencker *et al.*, 2021). Researchers have argued that the opportunity costs (sunk costs) are lower in earlier career stages (Merida and Rocha, 2021) which may make them exit early. On contrary, Lévesque and Minniti (2006) have argued that ageing reduces the relative return to entrepreneurship; which can make individuals concentrate more on waged labour and relatively less on new venture creation, suggesting older individuals might exit early.

Gielnik, Zacher and Wang (2018) found that younger individuals are more relaxed about the future time perspective than older individuals, therefore are less likely to exit early. However, they also found that older founders benefit from their accumulated experiences, which help them in successfully transitioning from one stage to another within the entrepreneurial process, hence I would expect older founders to not quit in a shorter period of time. Similarly, (Belenzon, Shamshur and Zarutskie, 2019) have argued that younger founder has lower exit cost as they have better alternative employment opportunities, which suggest that they may exit earlier than older individuals. It has also been argued that younger founders have a lower cost of exit in terms of having alternative employment opportunities (Belenzon, Shamshur and Zarutskie, 2019), which can lower their chances of an exit. However, I want to understand a clear outcome of the process from a duration perspective. Surviving or continuing with the entrepreneurial process is one outcome but that does not give us clarity on how age influences founders' behaviour in terms of time duration.

Cueto, Suárez and Mayor (2020) found entrepreneurs' age to be positively related to venture survival rates and that the probability of survival increases with age, and individuals between 30 to 54 years of age had the highest ratio in terms of venture survival. Azoulay et al. (2020) found middle age and above founders to be more likely to be successful in launching a new venture, hence suggesting a lower likelihood of them quitting the entrepreneurial process. Bohlmann *et al.* (2017) argued that though physical strength decline in old age but it is compensated by higher accumulated human capital (e.g. knowledge and skills), suggesting fewer chances of exit. Muñoz-Bullón and Cueto (2010) found that prime-age workers have a higher survival rate and that younger individuals have a higher venture exit probability due to entering alternate employment opportunities or entering into unemployment. Given that older entrepreneurs may benefit more from their cognitive and social strengths than younger founders (Zhao *et al.*, 2021) and as the literature suggest that they may have higher exit costs in terms of fewer alternate employment opportunities, and on the other hand them benefiting from accumulated knowledge and skill, I postulate:

Hypothesis 1e: Older nascent entrepreneurs are less likely to exit early.

Human capital based entrepreneurial research has argued for the need to explore if there is any sort of synergistic effect present for different human capital factors (Wright and Mcmahan, 2011) and if any trade-offs exist for different types of entrepreneurial outcomes (Boon *et al.*, 2018). Crook *et al.* (2011) argued that general and specific human capital is important both on their own and when they are combined or studied as a single construct. However, Nyberg *et al.* (2014) pointed out that understanding the precise nature of the human capital constructs and their effects can be confusing because of challenges around data collection and measurement of each component. To my knowledge, so far no study has investigated the interactions between all (i.e. both general and specific) types of human capital for their impact on the duration to the founder's exit. Specific human capital (e.g. industry experience) would be less relevant in another context, however, general human capital can be transferable to other contexts (Kryscynski, Coff and Campbell, 2021) and I believe that the transferability of general human capital would overcome any context related limitations that specific human capital brings. I am therefore empirically testing the interactions because research has suggested that although general human capital (educational attainment and work experience) has its importance (Rauch and Rijsdijk, 2013; Unger *et al.*, 2011), it might not be sufficient to compensate for any limitations of specific (e.g. prior start-up experience) human capital (Stucki, 2016).

Huggins, Prokop and Thompson (2017) found that higher (university) educational attainment may not necessarily provide entrepreneurs with all skills that can help with successful venture

creation (Unger *et al.*, 2011) because key venture creation knowledge can only be acquired through practically going through prior start-up experience (Nguyen, 2019). However, nascent entrepreneurs benefit from their previous entrepreneurial experience (Mamabolo, Kerrin and Kele, 2017) as they gain confidence gained through testing their entrepreneurial abilities (Taylor, 1999). I would, therefore, expect education and prior start-up experience to complement each another, and lower the likelihood and duration to founders' exit for paid employment. Education is also believed to improve entrepreneurial judgement through analytical abilities, general research skills, and communications skills (Parker, 2018a), which together with individuals' prior entrepreneurship experience provides individuals with venture start-up capabilities, better market research/insight, success at external funding (e.g. seed funding) and better network (Krieger, Block and Stuetzer, 2018). In line with this notion, I posit that higher education and prior start-up experience would complement each other.

Prior work experience adds to the skills variety of an individual (Krieger, Block and Stuetzer, 2018) which include venture management skills, market identification skills and preparing external funding plans (Ganotakis, 2012). This should become useful for founders without any prior start-up experience as they would be less acquainted with effectively developing and coordinating multiple functional capabilities simultaneously (Symeonidou *et al.*, 2022). Such complementarity should then help them to continue with the entrepreneurial process and make them less likely to exit in a shorter duration. It has also been argued that work experience may not necessarily provide entrepreneurs with all skills that can help with successful venture creation (Unger *et al.*, 2011) because key venture creation knowledge can only be acquired through practically going through prior start-up experience (Nguyen, 2019). However, with entrepreneurial experience these founders can benefit from enhanced learning capacity and capabilities, enabling them to manoeuvre through the complex and challenging start-up process (Lafuente *et al.*, 2021). Work experience also helps individuals learn about the practicalities of venture management and promote entrepreneurship (Parker, 2018a) and as prior start-up experience provides individuals with better venture prospects (e.g. sales and profit) (Coad *et al.*, 2014), a complementarity effect is expected, which will delay the chances of founders disengagement from the process. After reflecting on existing literature and the likelihood of complementarities between general (education and work experience) and specific (prior start-up experience), I posit:

Hypothesis 2a: Nascent entrepreneurs with higher educational attainment and prior start-up experience are less likely to exit early.

Hypothesis 2b: Nascent entrepreneurs with work experience and prior start-up experience are less likely to exit early.

It has been argued that the founder's industry experience (pre-entry experience) might conflict with the start-up's experiential learning, which is more contextual and relevant (Hashai and Zahra, 2022). However, formal education equips founders with better research skills, and analytical and communication capabilities (Parker, 2018a), and that should compensate for a more specific element of industry experience. Unger *et al.* (2011) have also found that entrepreneurs with industry experience and higher educational attainment are more likely to be successful than those who have lower human capital in terms of industry experience and general education, hence suggesting fewer chances of a founder's disengagement. Moreover, both educational attainment and industry experience increase founders' capabilities in terms of both exploring and exploiting business opportunities, contributing to venture success (Bae *et al.*, 2014; Martin, McNally and Kay, 2013). This would mean that these factors would have a synergised effect and hence make founders' exit less likely. Formal education and prior industry experience also provide founders with higher absorptive capacity and adaptability (Nielsen, 2015), which can help in avoiding risks that can contribute to an earlier exit. Industry experience, in particular, assists them in better customer identification skills (Hashai and Zahra, 2022), provide them with better industry networks, and makes them efficient at pursuing less risky ideas benefitting from their industry experience (Nielsen, 2015). However, formal education encourages individuals to risk-taking and makes them less risk-averse (Black *et al.*, 2018; Chen, Su and Wu, 2012), which should complement founders with industry experience who tend to opt for low-risk opportunities. In line with this notion, I posit that these founders would be less likely to exit, benefitting from better industry insight and network through their industry experience and a risk-taking appetite linked to higher educational attainment.

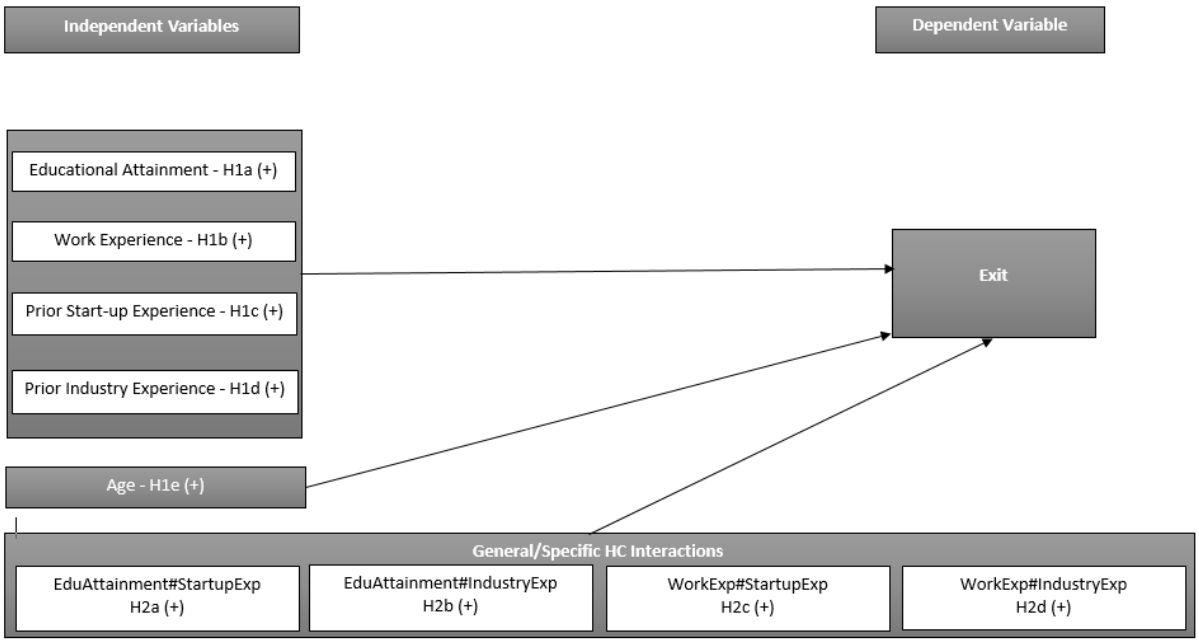
Industry experience and work experience are found to stimulate entrepreneurs to leave the process earlier as these factors increase their propensity to occupational transition into other ventures (Carbonara, Tran and Santarelli, 2020). On the contrary, research has found that both industry experience and work experience have a positive impact on venture survival, given these individuals would have accumulated better regulatory knowledge and information, market insights, and network (customer and supplier) development (Caliendo, Goethner and Weißenberger, 2020). Industry experience has also been linked to the founder's persistence due to the industry-specific experience and learning-by-doing experience gained from prior work experience (Rocha, Carneiro and Varum, 2015). The literature also suggests that individuals with work experience and industry experience are likely to have better venture outcomes (Burton, Sørensen and Dobrev, 2016). The industry experience has been linked to better rates of entrepreneurial success (Azoulay et al., 2020) as these entrepreneurs are more likely to have better customer and stakeholder insight (Ganotakis, 2012). This can be complemented by work experience which provides them with tacit knowledge and develops

their skills to formulate a better strategy around customer acquisition and decrease doubts about the value of pursuing the identified opportunities (Protogerou, Caloghirou and Vonortas, 2017). In line with the suggested complementarities between higher education and industry experience, and work experience and industry experience, I posit:

Hypothesis 2c: Nascent entrepreneurs with higher educational attainment and prior industry experience are less likely to exit early.

Hypothesis 2d: Nascent entrepreneurs with work experience and prior industry experience are less likely to exit early.

Figure 3.1 Conceptual Framework



3.3 Material and Methods

3.3.1 Sample

Bird (2015) highlighted the need to use samples other than students and establish entrepreneurial actions and the timing of those actions. Panel Survey of Entrepreneurial Dynamics (PSED), based on a longitudinal study, is a unique source of nascent entrepreneurial study (Kerr, Kerr and Xu, 2017) and despite numerous studies have been conducted using this source, its potential has not been exhausted because further contributions can be made by applying innovative process conceptualisations to the data

(Davidsson and Gruenhagen, 2021). A PSED-based study also eliminates recall, survivorship, and self-justification biases (Davidsson and Gordon, 2012; Cassar, 2007), particularly important from the exit perspective. Moreover, by controlling for different types of ventures (i.e. hi-tech/non-hi-tech), I was in a position to eliminate some of the unmeasured heterogeneity problems (Davidsson and Gruenhagen, 2021).

3.3.2 Operationalisation: Dependent Variable

Outcome Quit: Disengagement

Both the US PSED I and II have a largely similar definition for quit and in both projects, the month and year of disengagement were provided by the nascent entrepreneur respondent (Reynolds and Curtin, 2008) on all team members, and if they are no longer working on the start-up (Shim and Davidsson, 2018; Reynolds, 2016). Shepherd, Souitaris and Gruber's (2021) operationalisation of founder exit was when the individual involved in the venture creation process leaves his/her role as the owner and/or the manager of that venture. Hechavarria, Renko and Matthews (2012) operationalised quitting when all respondents self-identified as disengaging from the process. Termination of the start-up initiative is when neither the respondent nor other team members are planning to pursue the start-up (Davidsson and Steffens, 2010). Kwapisz (2019) also followed the same PSED protocol and considered it a quit when the respondents claimed that little recent work on the start-up and no expected future work related to the start-up initiative is envisaged. Reynolds *et al.* (2018) argued that disengagement from the entrepreneurial process is theoretically unambiguous and although some PSED projects have used different procedures for operationalising abandonment, they do not differ widely, hence considering those procedures with some variations, for all cohorts as respondents quit the start-up and/or assumed abandoned. For this chapter, therefore, we would consider both PSED I and II exit procedures as an exit classification, in line with Reynolds *et al.* (2018). I would also like to mention here that in the Chapter 2 the dependent variable was the creation likelihood of a profitable new venture in shorter time duration (i.e. outcome profit in 3.3.3 below) while accounting for the competing risk (possibility of an exit before a venture is being created) and in this chapter it is the other way around.

3.3.3 Operationalisation: Competing Risk

Outcome Profit

PSED paradigm defined a new profitable firm's birth when a positive monthly cash flow is generated, covering expenses and owner-manager salaries for six of the previous twelve months (Reynolds and Curtin, 2011). US PSED I & II have used the initial presence of monthly

profit as the definition of new venture creation (Reynolds et al., 2016) and this study has used Reynolds *et al. (*2018) criteria for identifying a new firm's birth.

3.3.4 Operationalisation: Independent variables

Education

The operationalisation of general human capital has been linked to the number of years of formal education (Toft-Kehler, Wennberg and Kim, 2014). Among some of the most common measures of an individual's human capital is the length of time spent in school or the type of educational attainment (Keeley, 2007a). Education, a categorical/predictor variable, has been widely operationalised by linking it to educational attainment in terms of years of education (Frid *et al.*, 2016; Hopp, 2015; Brinckmann and Kim, 2015).

Work Experience

Nascent entrepreneurship studies have operationalised work experience mostly in two ways. Some consider work experience as a binary variable measuring whether the founder had prior work experience or not (Stuetzer, Obschonka and Schmitt-Rodermund, 2013; Mueller, 2006), or in terms of years of experience (Brinckmann and Kim, 2015; Davidsson and Honig, 2003). In this chapter, the work experience is operationalised as none or yes.

Start-up experience

PSED studies have operationalised previous start-up experience in many ways with some of the recent ones considering start-up experience as a binary variable measuring whether the respondent and/or any founder had prior start-up experience (Davidsson and Gordon, 2016; Frid *et al.*, 2016). Other studies have operationalised previous venture creation experience via the founding team venturing experience calculated by the mean of the number of start-ups they started in the past (Li and Dutta, 2018) or by calculating the total number of other ventures founded (Hopp, 2015; Brinckmann and Kim, 2015; Dimov, 2010). In this chapter, the prior start-up experience is operationalised as none or yes.

Industry experience

Nascent entrepreneurship studies have operationalised prior industry experience mostly in two ways. Some consider industry experience as a binary variable measuring whether the founder had prior industry experience or not (Klyver, Steffens and Lomberg, 2020; Block and Koellinger, 2009). In other, industry experience has been operationalised by the number of years (if any) spent working in the industry (Laffineur *et al.*, 2019; Frid *et al.*, 2016; Davidsson

and Gordon, 2016; Raffiee and Feng, 2014; Hechavarria, Renko and Matthews, 2012; Dimov, 2010). In this chapter, the industry experience is operationalised as none or yes.

Age

Age being a continuous variable has been self-reported by the respondents in the PSED sample (Frid *et al.*, 2016). Li and Dutta (2018) operationalised age as the average age of founding team members, calculated as the mean of team members' ages. In my sample, I have applied the upper age limit to 75 years, in line with the upper age recorded in other cohorts.

3.3.5 Operationalisation: Control Variables

Business Idea

Having a business idea helps nascent entrepreneurs in an efficient implementation as they can get and incorporate market feedback on their initial idea (Lynch and Corbett, 2021). Founders test their business ideas' viability and choose to disengage if not found viable (Gottschalk and Müller, 2022). Founders with a business idea may invest more resources with an expectation of better returns, and hence be willing to take a higher risk (DeTienne, McKelvie and Chandler, 2015b). Gottschalk and Müller (2022) have also argued that founders with a business idea test it and if they found it no more viable, they leave the process and start pursuing a new one. Similarly, Trabskaia and Mets (2021) have also suggested that reassessment of a business idea by the founder, throughout the entrepreneurial process, and hence their decision to continue may be influenced by the objectivity and effectiveness of the circumstances at a particular point in time. Duration to quitting the entrepreneurial process has therefore been linked to having a business idea (Merida and Rocha, 2021). In this chapter, the business idea is operationalised as none or yes.

Hi-Tech

The venture creation duration also depends on the venture type (Gordon and Davidsson, 2013; Samuelsson and Davidsson, 2009; Liao and Welsch, 2008), and technology intensity and innovativeness may impact the prospects of venture creation (Brinckmann and Kim, 2015; Khan, Tang and Joshi, 2014; Hechavarria, Renko and Matthews, 2012). Nascent entrepreneur's industry type, high-technology vs low-technology, has also been used in a study by Li and Dutta (2018).

Gender

It has been argued that gender impacts the time devoted to the venture creation process and firms founded by female team members only spend less time than all-male or mixed-gender founding teams (Gordon and Davidsson, 2013). Gender has therefore been widely used as a control variable (Laffineur *et al.*, 2019; Davidsson and Gordon, 2016; Brinckmann and Kim, 2015; Renko, Harris and Caldwell, 2015; Raffiee and Feng, 2014; Hechavarria, Renko and Matthews, 2012; Dimov, 2010).

Team size

A team's imaginativeness (creative, social and practical) may compensate for another member(s) shortcomings (Kier and Mcmullen, 2020). Davidsson (2012) controlled the team size because it can give an advantage in terms of pooled resources. Muñoz-bullon, Sanchez-bueno and Vos-saz (2015) used team size (number of people sharing ownership) as a control variable as it not only increases better access to resources but can potentially expose tam to conflicts based on different viewpoints on venture-related decisions. Bhawe, Gupta and Pollack (2017) controlled for total founding team size when studying founder exit and firm performance. It has been argued that larger teams may mitigate the liability of newness (Bamford, Bruton and Hinson, 2006), however, it has also been found that single-founder start-ups have a higher likelihood of an exit (Xi *et al.*, 2020). I have, therefore, used it as a control variable.

Time commitment

Davidsson (2012) has argued that nascent entrepreneurs have different time availability because of their part-time/full-time/unemployed/retired status which gives part-timers (i.e. in part-time jobs) more time to spend on the new venture, and hence the need for 'time devoted' to be controlled. Gelderen, Thurik and Bosma (2005) operationalised the time (hours worked per week) invested by the entrepreneur in the new venture and considered it as a proxy of the entrepreneur's commitment to the new venture creation process and found it to be positively correlated with venture survival. Time spent on venture creation can also provide affect the entrepreneurial quit rate, and I have therefore used the binary (yes/no) classification for time invested by the nascent entrepreneur (Reynolds, 2018).

Funding (personal funds and external funding)

I have also controlled both personal funds (begin investing own money: yes/no) invested as well as the external funding (received funding from external sources: yes/no). Yamakawa and Cardon (2017) found money invested in a start-up can lead to a delayed entrepreneurial exit. Frid, Wyman and Gartner (2015) found that investing own money increases the likelihood of a successful venture creation as compared to a founder quitting the entrepreneurial process.

PSED I question on personal funding was, how much of your own money, in total dollars, have you now put into this new start-up – either to purchase ownership or as a loan to the new business? (INCLUDE ALL PERSONAL FUNDS FROM ALL SOURCES). For PSED II the question was, in what month and year was the initial money invested (by you/[NAME])?

Hechavarría, Matthews and Reynolds (2016) argued that external equity utilisation during the entrepreneurial process is a key resource in terms of speed to new venture creation. Start-ups with failed attempts at external funding are less likely to survive due to scalability issues (Rosenbusch, Brinckmann and Bausch, 2011) hence pointing towards a possibility of an earlier exit. It has been argued that both human and financial capital can provide new-venture legitimacy, which is vital for any new venture (Shepherd, Souitaris and Gruber, 2021). For external funding questions in PSED I, the question was, whether the other source of money for businesses is loans or debt. This money must usually be paid back and often there is interest. Right now, what is the total amount of loans or borrowing by the business? PSED II asked about debt from government agencies already collected? /Any other loan or debt already collected?

Initial sales

I have also controlled for initial sales, revenue, income made (yes or no). Entrepreneurs embark on an entrepreneurial journey by predicting future demand and the timing of meeting those demands (Packard and Burnham, 2021) and it has been found that initial sales decrease the likelihood of a founder's exit (Liao, Welsch and Tan, 2005; Reynolds and Miller, 1992). Initial sales based on founders' initial exchanges with their suppliers and customers contributes toward new venture creation (Katz and Gartner, 1988) and hence I wanted to control the impact of initial sales on the duration to exit. The PSED I questions on sales were, in what year/month was the last sales, income or revenue received? For PSED II it was, in what month and year was the first revenue received from the sale of
goods or services for this new business?

Preference for firm Growth

I have also used control for the founder's growth orientation (to maximise growth: yes/no) because nascent entrepreneur's with a growth focus are more likely to reach profitability, and equally more likely to quit (Reynolds, 2018). New venture initiatives also differ based on their founders' growth expectations in terms of the expected venture's scalability (Hechavarria, Schenkel and Matthews, 2009), which may include motivation for financial success (Hessels, Gelderen and Thurik, 2008). PSED-based studies by Hechavarría, Matthews and Reynolds

(2016) and Gartner and Liao (2012) have used the founder's growth preference as a control variable, whereby the study by Gartner and Liao (2012) did not find venture growth aspirations to have significantly affecting venture creation. Similarly, Edelman *et al.*(2010) argued that although venture growth could be an important external validation of success, nascent entrepreneurs do not necessarily associate entrepreneurial process outcomes with their growth intentions.

For both the PSED I and PSED II the question on growth preference was, which of the following two statements best describes your preference for the future size of this new business: I want this new business to be as large as possible, or I want a size I can manage myself or with a few key employees?

Business Plan

Hechavarria, Li and Reynolds (2017) found that business planning, early in the entrepreneurial process, can significantly reduce the duration to a profitable outcome. A business plan assists nascent entrepreneurs in better exploring their business idea and creating an action plan accordingly, which also helps them to learn and to incorporate any required changes to venture performance targets (McCann and Vroom, 2015). Business planning may also serve as an important model, consisting of start-up activities, a clear start-up focus (Mansoori and Lackéus, 2020), and reflect the informational circumstances of the time that promises better start-up outcomes (Brinckmann, Grichnik and Kapsa, 2010). Wei *et al.* (2018) found, based on the CPSED (China) study, that business planning positively affects new venture emergence as it helps nascent entrepreneurs to evaluate different opportunities and continue with the most promising ones. Hechavarría, Matthews and Reynolds (2016) also found that business planning can significantly increase the likelihood of new venture creation. However, (Reynolds, 2018) suggested that business planning is not critical to achieving profitability. Honig and Hopp (2016) also found that although a majority of nascent entrepreneurs began with a business plan but not many, only about one-third, follow those plans in the later stages of the entrepreneurial process. This is because business planning may not provide advice on stakeholder interaction and mainly focus on the founder's activities (Mansoori and Lackéus, 2020). Reynolds (2016) has also argued that business planning may increase the likelihood of quitting the entrepreneurial process and may also shorten the duration of disengagement. I have therefore used having a business plan (yes) or not (no) as a control for this chapter on duration to exit.

For PSED I the question on business plan was, a business plan usually outlines the markets to be served, the products or services to be provided, the resources required, including money and the expected growth and profit for the new business. Has a business plan been prepared

for this start-up? For PSED II the question was, a business plan usually outlines the markets to be served, the products or services to be provided, the resources required including money and the expected growth and profit for the new business. (Have/Had) you already begun preparation of a business plan for this new business, (will you prepare one in the future), or (is/was) a business plan not relevant for this new business (before your involvement ended)?

3.4 Methods – Cox and Competing Risks Model

Survival analyses consider all subjects who are at risk of experiencing an event and follow those subjects till the time of an event of interest and those subjects who have not experienced the event of interest before the end of the study period (Noordzij *et al.*, 2013). Maula and Stam (2019) suggested that in the PSED's longitudinal research design, the use of fixed-effects survival models that include controls for time-invariant unobserved heterogeneity has helped in addressing any source of omitted variable bias, given that start-up activities can be heterogeneous and can change over time. Zettel and Garrett (2021) have used the Cox model to measure the likelihood of an entrepreneur abandoning the venture creation process. Honig and Hopp (2019) in their PSED II study, also used the Cox model to establish a time for the disbandment of venture creation efforts. Wennberg, Delmar and Mckelvie (2016) also modelled venture exit using the Cox model. Hechavarría, Matthews and Reynolds (2016) also employed an event history analysis and tested their hypothesis through Cox proportional hazards regression and competing risk regression models to estimate the risk of disengagement (quitting) from the entrepreneurial process. Cox proportional hazard regressions are predominantly applied where no assumptions about the shape of the baseline hazard rate are required (Soto-Simeone, Siren and Antretter, 2020) and although this method ignores the competing event(s) that may be involved in duration studies (Noordzij *et al.*, 2013), it has been found useful when the baseline hazard function is either unknown or difficult to estimate, as is often the case with venture level survival data (Gifford *et al.*, 2020). The Cox model is therefore particularly useful in this study to estimate the risk of disengaging from the start-up process via quitting.

Kaplan-Meier survival estimator

The non-parametric Kaplan-Meier survival estimator (Deng *et al.*, 2022; Felipe *et al.*, 2022; Carbonara, Tran and Santarelli, 2020) and the semi-parametric, Cox proportional hazard model, have been widely used to study venture survival likelihood in venture duration studies (Basco *et al.*, 2020; Carbonara, Tran and Santarelli, 2020). I have used the Kaplan-Meier survival approach to show the survival patterns for all variables of interest (e.g. human capital

and age) in addition to the Cox proportional hazards model, which provides survival estimates (Khurana and Farhat, 2021; Baptista, Karaöz and Leitão, 2020).

Competing risk models

This study has also benefitted from the competing risk models that have bridged any gaps (i.e. avoid biased results) that classical time-to-event models (e.g. Cox) face, as it incorporates the option of multiple destinations/outcomes in the modelling (Karunarathna and Sooriyarachchi, 2017). Competing risks are the events that either preclude the observation of the primary outcome or may change the probability of its occurrence (Feakins *et al.*, 2018), in this chapter the outcome profit variable. The competing risk analysis is particularly useful in calculating real-world probabilities by factoring in other competing risks (e.g. successful venture created) faced by nascent entrepreneurs, and not only the option of quitting, and therefore has been considered the most appropriate technique to study such hazards (Hechavarría, Matthews and Reynolds, 2016). Oberschachtsiek (2012) also suggested incorporating competing risk modelling to ensure that we control for the nature of exits (i.e. different process outcomes). Therefore, a duration model should incorporate competing risk modelling.

Robustness checks

Competing risks survival analysis has been used as an alternative model specification (Yli-renko, Denoo and Janakiraman, 2020), and my study focuses on the survival time to exit outcome, taking into account, more explicitly, the other possibility (i.e. Outcome - Profit) available to the nascent entrepreneurs. Moreover, the longitudinal research design has ensured that the data is robust and reliable. I have also provided a comparison of Kaplan-Meier curves, which are believed to be a good validating approach (Royston and Altman, 2013).

3.5 Analysis and results

3.5.1 Descriptive statistics

Table 3.1 and 3.2 shows descriptive statistic and correlations for all variables. All of the correlations for Outcome - Exit (i.e. study focus) are low to moderate.

Table 3.1 Variable descriptive statistics

Variables	Definition / Criteria (Reynolds *et al.*, 2016)	Mean	Std. Dev.	min	max
OutcomeQuit	US PSED I: No longer worked on by anyone. US PSED II: Less than 160 hours devoted to venture in past 12 months, expect less than 80 hours of work on the venture in the next 6 months, no longer a major focus of the work career.	.193	.395	0	1
OutcomeProfit	A firm birth. is considered to be the initial presence of monthly profits that covers expenses and owner salaries.	.15	.357	0	1
EduAttainment	Educational attainment (level) of team member 1 (respondent). Represented in regression by a set of indicator variables. 1 = up to high school degree; 2 = post-high school, pre-college degree; 3 = college degree; 4 = graduate degree	2.309	.982	1	4
WorkExperience	Work experience (years) of team member 1 (respondent)	.986	.118	0	1
StartupExp	Other start-up experience. Have helped to start other businesses as an owner or part-owner = 1.	.457	.498	0	1
IndustryExp	Same industry experience. Years of work experience in the industry where the new business will compete.	.766	.423	0	1
Age	Age of Respondent (alternatively categorised into age groups).	41.691	12.069	18	74
BusinessIdea	Source of initial motivation (business idea) of team member 1 (respondent) = 1	.769	.421	0	1
HighTechOrNot	Consider business hi-tech? Based on three items reflecting the technological sophistication of the firm: • Were the technologies or procedures required for this product or service generally available more than a year ago? • Were the technologies or procedures required for this product or service generally available more than five years ago? • Will spending on research and development be a major priority for this (new) business?	.287	.452	0	1
Gender	Declared gender (Respondent)	1.418	.493	1	2
TeamSize	Total number of owners	1.665	.883	1	5
FullTimeBasis	Full time start-up work	36.386	48.111	0	100
InvestedOwnMoney	Began investing own money	86.063	34.634	0	100

ExternalFundingReceived	Received funding from external sources	16.775	37.364	0	100
InitialSalesMade	Initial sales, revenue, income made	65.256	47.616	0	100
GrowthPreference	Grow to a size that is easy to manage size or maximise firm growth	.21	.407	0	1
BusinessPlanInitiated	Business plan initiated or not	72.225	44.789	0	100
EntrepreneurialDesire	Source of initial motivation (desire to be an entrepreneur) of team member 1 (respondent) = 1	.633	.482	0	1

Table 3.2 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) OutcomeQuit	1.000								
(2) OutcomeProfit	-0.206*	1.000							
(3) EduAttainment	-0.013*	0.047*	1.000						
(4) WorkExperience	-0.014*	0.026*	0.073*	1.000					
(5) StartupExp	-0.025*	0.042*	0.164*	0.050*	1.000				
(6) IndustryExp	-0.087*	0.015*	0.034*	0.005	0.035*	1.000			
(7) Age	-0.010	0.023*	0.208*	0.142*	0.253*	0.023*	1.000		
(8) BusinessIdea	0.010	-0.020*	-0.011	0.017*	-0.015*	0.095*	0.038*	1.000	
(9) HighTechOrNot	-0.043*	0.008	0.013*	0.000	0.011	0.019*	-0.038*	-0.024*	1.000
(10) Gender	0.032*	-0.025*	0.046*	-0.020*	-0.032*	-0.098*	0.035*	-0.010	-0.129*
(11) TeamSize	-0.018*	0.053*	0.071*	-0.011	0.008	-0.065*	-0.032*	-0.009	0.046*
(12) FullTimeBasis	-0.105*	0.159*	0.002	-0.033*	0.034*	0.122*	-0.003	-0.057*	0.048*
(13) InvestedOwnMoney	-0.059*	0.068*	0.030*	-0.023*	0.038*	0.039*	-0.011*	-0.075*	0.011
(14) ExternalFundingRcd	-0.068*	0.112*	0.051*	0.020*	0.033*	0.015*	0.014*	0.026*	-0.031*
(15) InitialSalesMade	-0.150*	0.253*	0.106*	-0.042*	0.046*	0.108*	0.071*	0.069*	-0.018*
(16) GrowthPreference	-0.023*	-0.040*	-0.016*	-0.023*	0.047*	-0.033*	-0.096*	-0.066*	0.139*
(17) BusinessPlanInitiated	-0.015*	0.072*	0.089*	0.021*	0.072*	0.046*	0.009	-0.012	0.053*
(18) EntrepreneurialDesire	-0.008	0.027*	-0.078*	0.002	-0.018*	0.009	-0.008	-0.417*	0.022*

*** p<0.01, ** p<0.05, * p<0.1

Variables	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) OutcomeQuit									
(2) OutcomeProfit									
(3) EduAttainment									
(4) WorkExperience									
(5) StartupExp									
(6) IndustryExp									
(7) Age									
(8) BusinessIdea									
(9) HighTechOrNot									
(10) Gender	1.000								
(11) TeamSize	-0.067*	1.000							
(12) FullTimeBasis	-0.043*	0.001	1.000						
(13) InvestedOwnMoney	-0.003	-0.086*	0.164*	1.000					
(14) ExternalFundingRcd	-0.048*	0.122*	0.092*	0.042*	1.000				
(15) InitialSalesMade	0.037*	-0.024*	0.248*	0.262*	0.196*	1.000			
(16) GrowthPreference	-0.086*	0.107*	0.023*	-0.013*	0.022*	-0.015*	1.000		
(17) BusinessPlanInitiated	-0.016*	0.111*	0.109*	0.081*	0.118*	0.089*	0.100*	1.000	
(18) EntrepreneurialDesire	-0.020*	-0.028*	0.056*	0.000	-0.017*	-0.028*	-0.028*	-0.042*	1.000

3.5.2 Results (in Graphical form)

Kaplan-Meier (Probability of surviving – based on the Cox model)

Kaplan-Meier graphs provide the estimated survivor function of data (Cleves, Gould and Marchenko, 2016). In the Kaplan-Meier output (Kaplan-Meier Curve), the estimates of survival rate are on the Y-Axis and the X-Axis is the number of quarters elapsed since the entry into the entrepreneurial process (Deng *et al.*, 2022). Kaplan-Meier comparative survival curves are provided for comparison (graphical). On Y-axis is the cumulative probability of surviving in a given time. The length of the X-axis denotes the survival duration for that interval (Khurana and Farhat, 2021).

The Kaplan-Meier survival estimates below show better survival rates (i.e. less likely to exit early) for nascent entrepreneurs with higher educational attainment, prior work experience, prior start-up experience, and prior industry experience. I have also added the risk table option that shows, at the bottom of the graph, the number at risk.

Figure 3.2 Kaplan-Meier survival estimates (Educational Attainment)

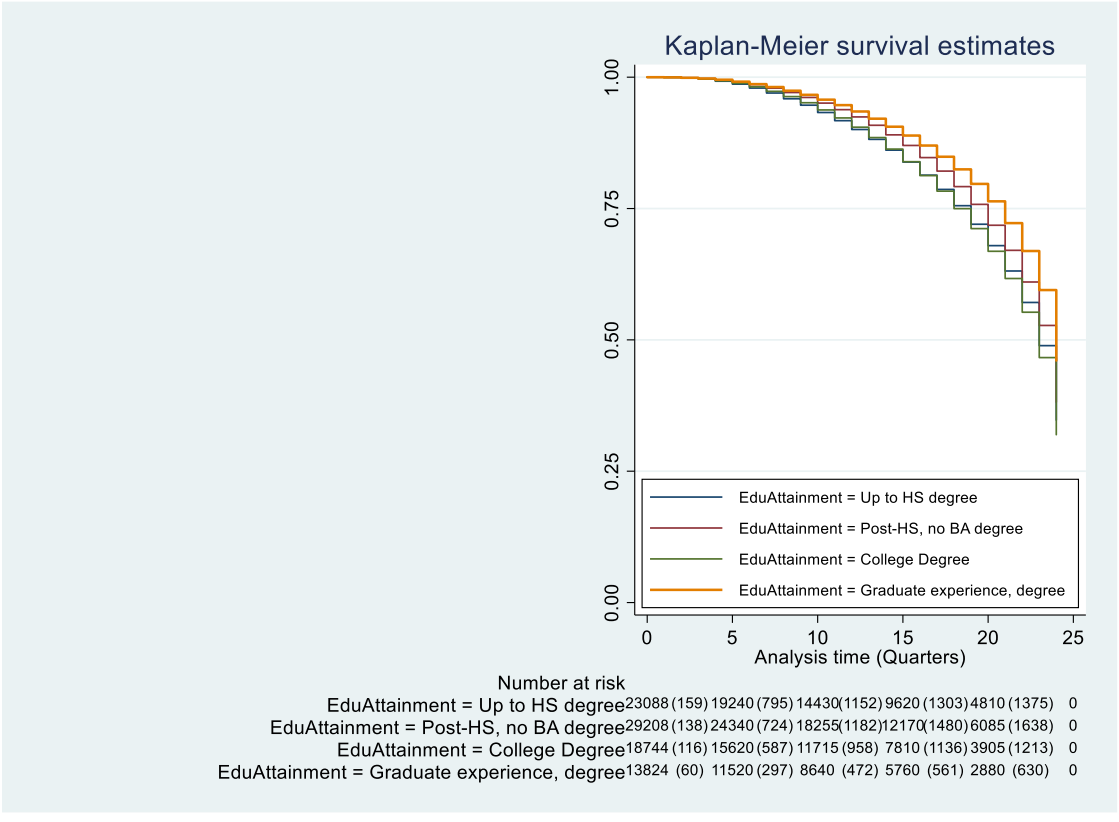


Figure 3.3 Kaplan-Meier survival estimates (Work Experience)

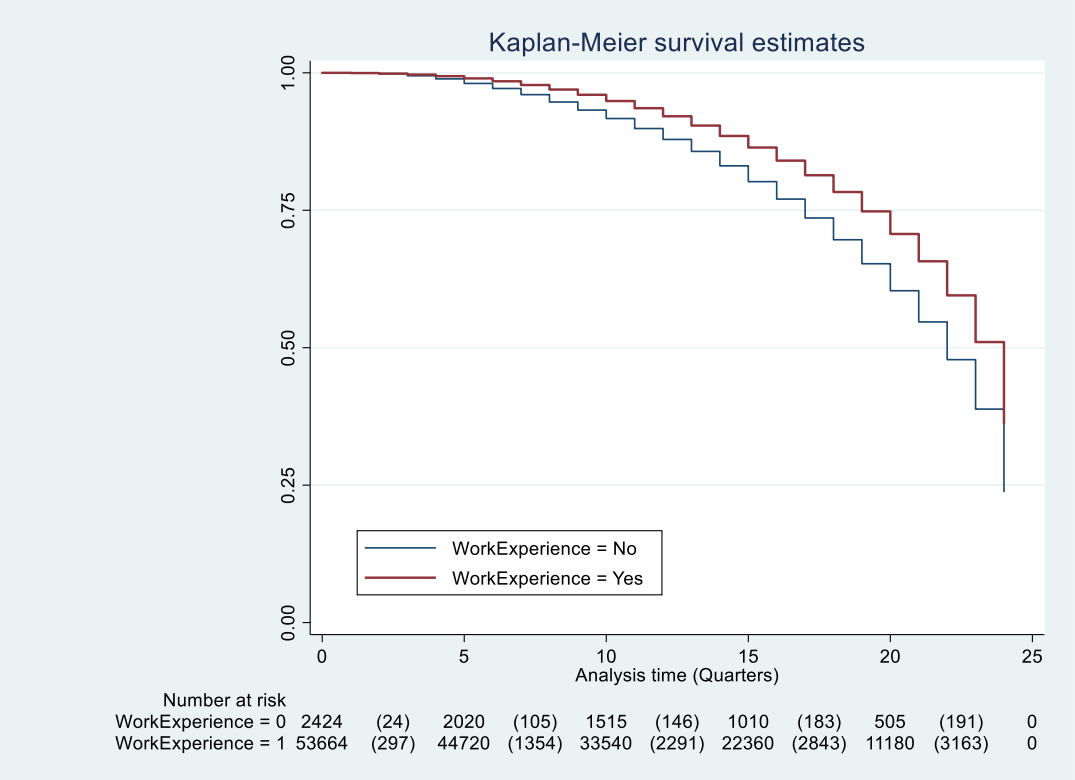


Figure 3.4 Kaplan-Meier survival estimates (Start-up Experience)

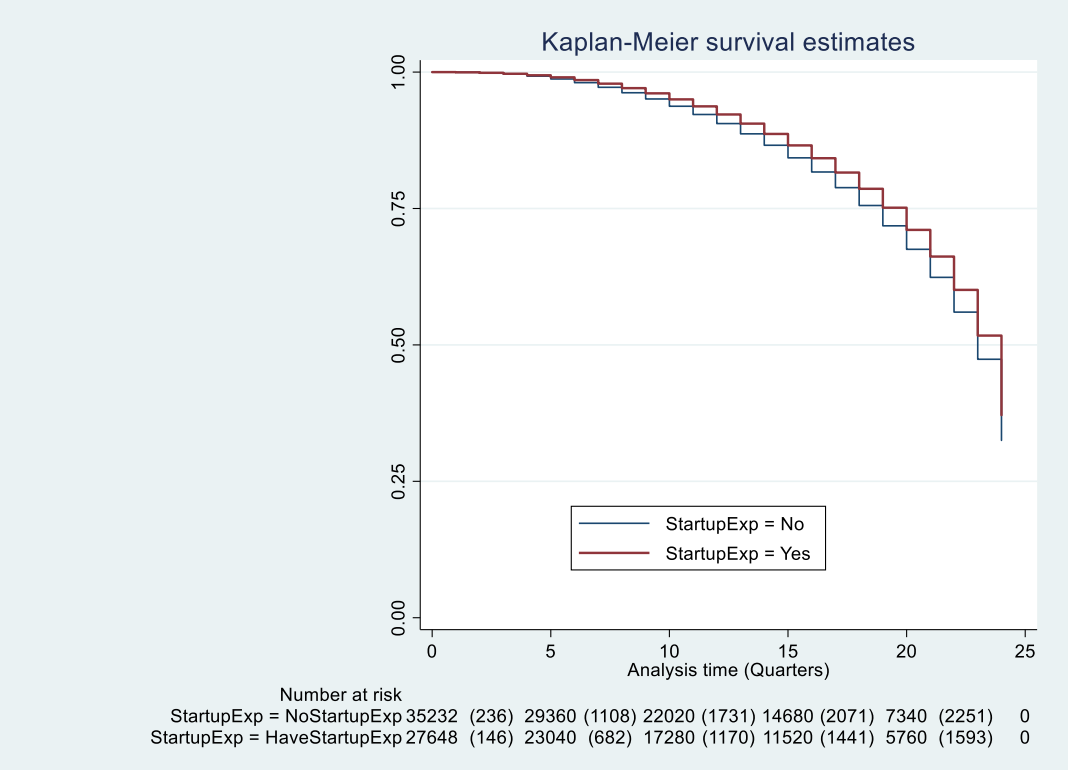
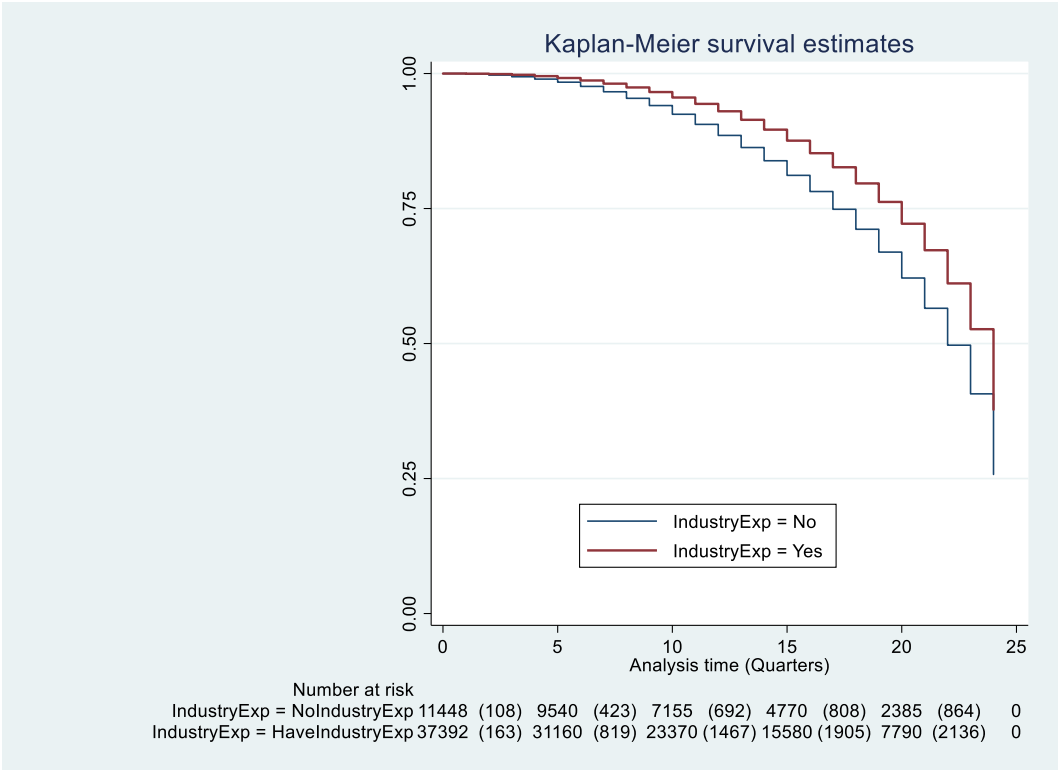


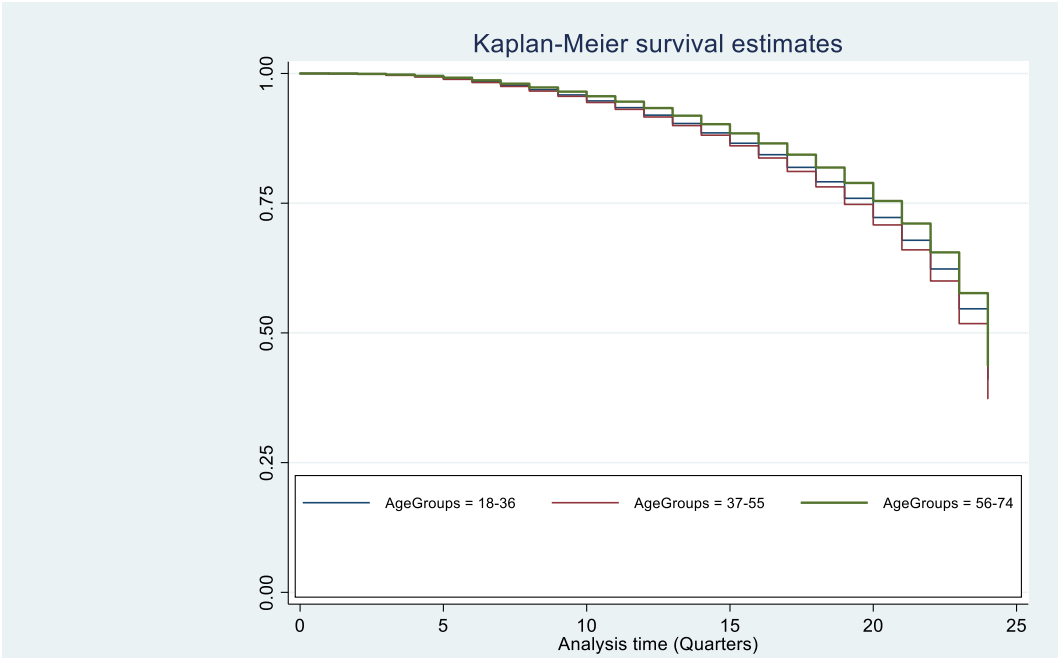
Figure 3.5 Kaplan-Meier survival estimates (Industry Experience)



Number at risk

IndustryExp = NoIndustryExp	11448	(108)	9540	(423)	7155	(692)	4770	(808)	2385	(864)	0
IndustryExp = HaveIndustryExp	37392	(163)	31160	(819)	23370	(1467)	15580	(1905)	7790	(2136)	0

Figure 3.6 Kaplan-Meier survival estimates (Age Groups)



Number at risk

AgeGroups = 18-36	40080	(193)	33400	(1078)	25050	(1676)	16700	(1946)	8350	(2046)	0
AgeGroups = 37-55	41280	(254)	34400	(1153)	25800	(1773)	17200	(2136)	8600	(2342)	0
AgeGroups = 56-74	9912	(41)	8260	(225)	6195	(349)	4130	(420)	2065	(482)	0

Competing Risks Graphs (stcurve command)

The estimated survivor function for competing risks analysis is provided below. The reduction in the founder's exit subhazard due to higher human capital accumulation directly translates to a reduction in the cumulative incidence of the founder's exit (Cleves, Gould and Marchenko, 2016).

Figure 3.7 Comparative cumulative incidence functions (Educational Attainment)

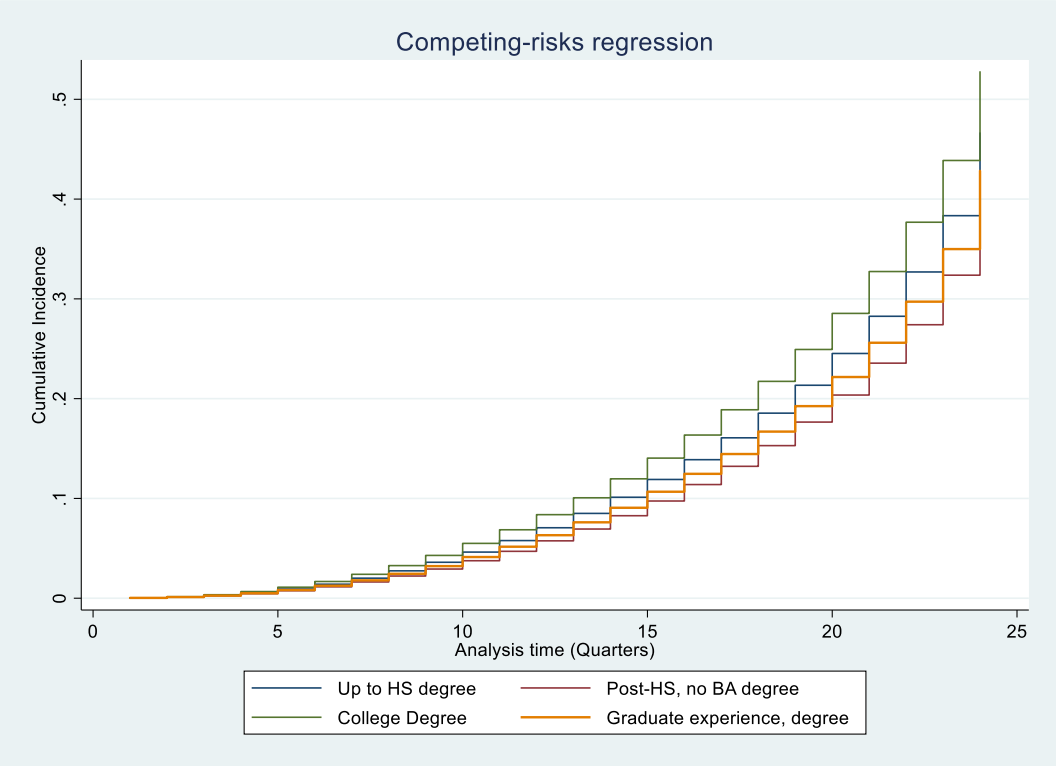


Figure 3.8 Comparative cumulative incidence functions (Work Experience)

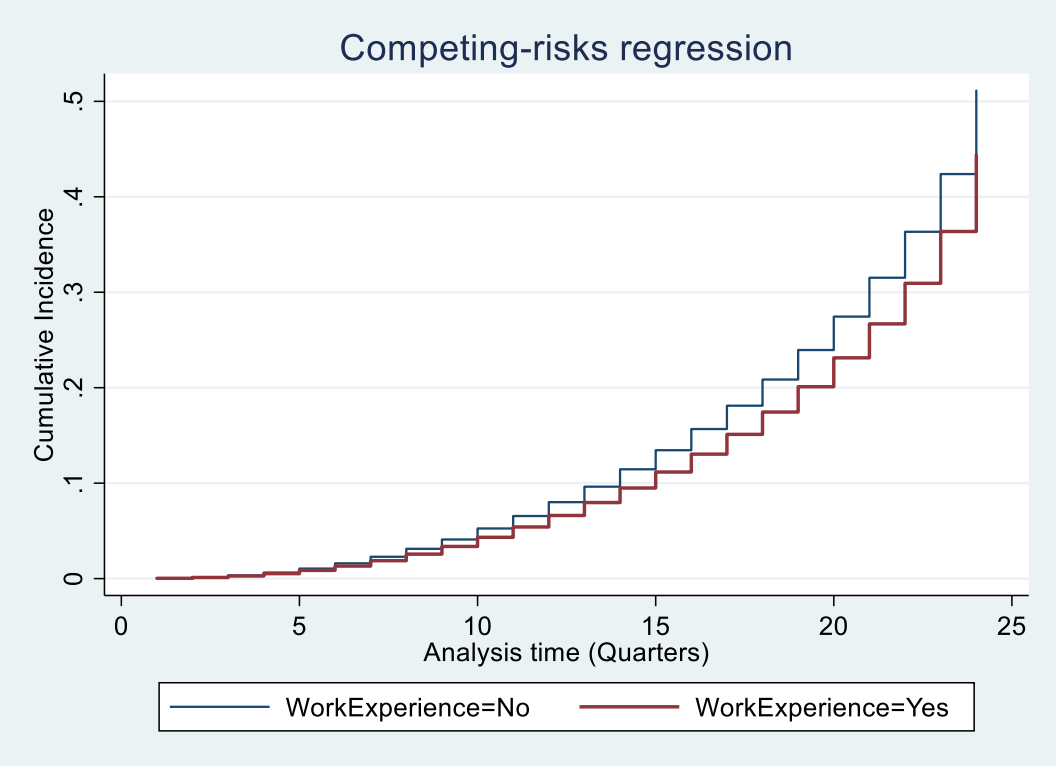


Figure 3.9 Comparative cumulative incidence functions (Start-up Experience)

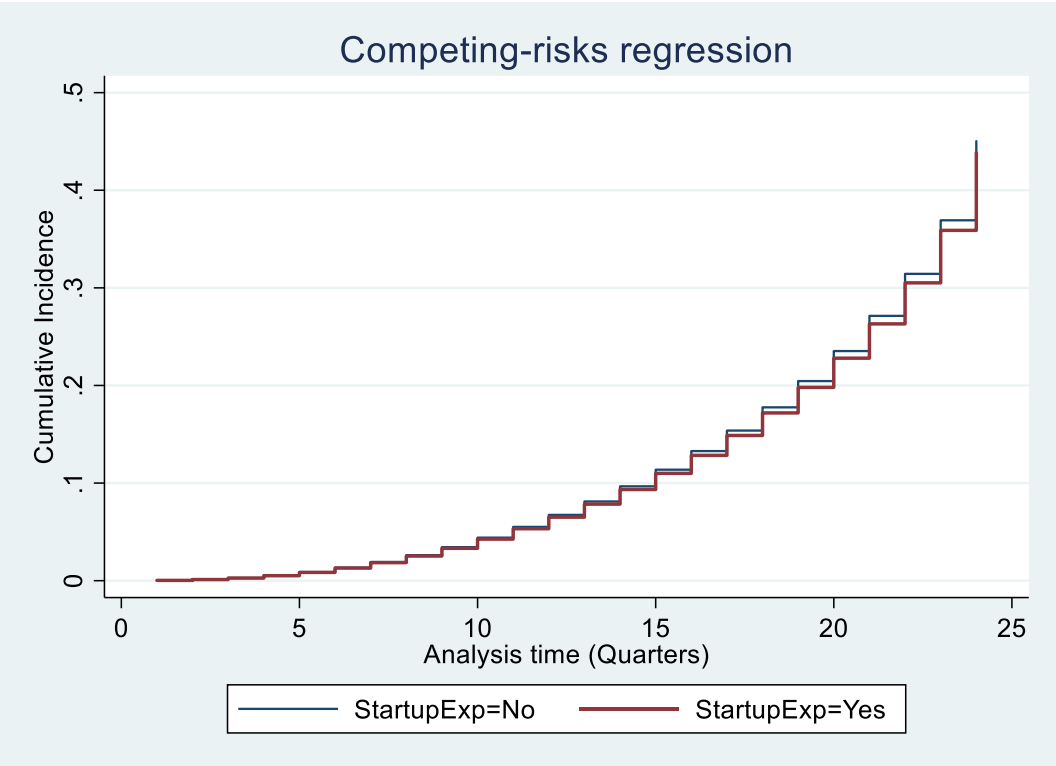


Figure 3.10 Comparative cumulative incidence functions (Industry Experience)

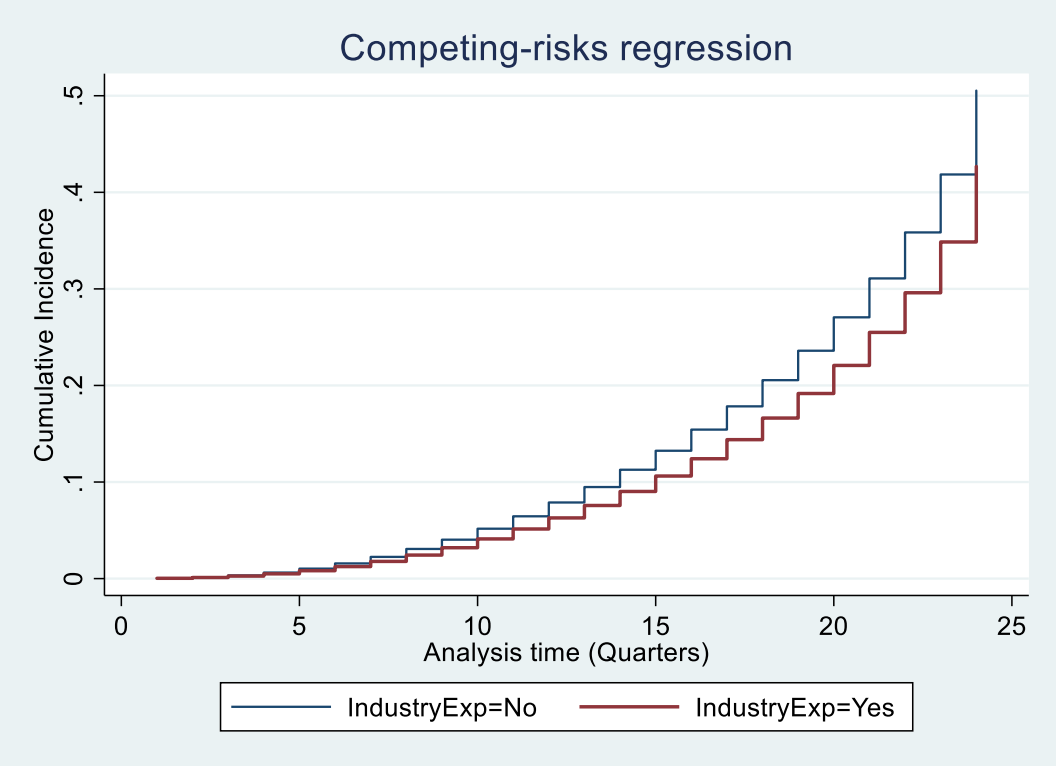
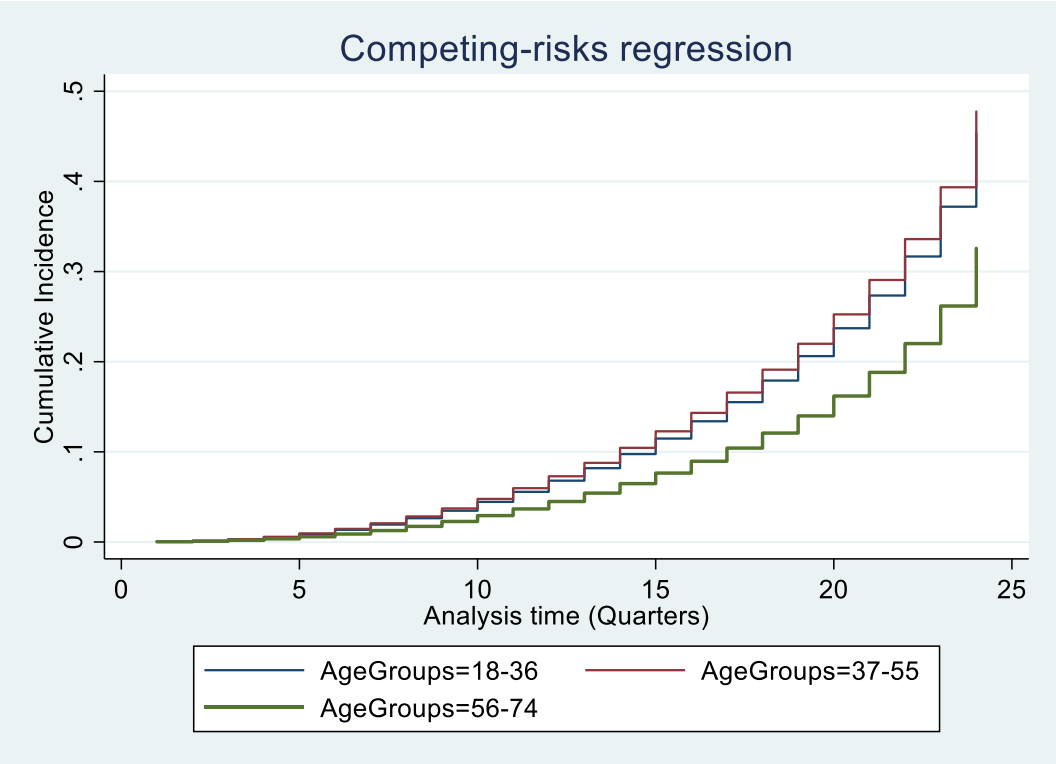


Figure 3.11 Comparative cumulative incidence functions (Age Groups)



3.5.3 Cox and Competing Risks models (Results)

Model 1 in Table 3.3 displays the hazard ratios and regression coefficients from the Cox model. Model 3 in Table 3.4 displays the results of sub-hazard ratios and regression coefficients from the competing-risks (exit) regression based on Fine and Gray's proportional sub-hazards model, and also shows the competing risks regression based on age groups. Model 5-8 (Cox) in Table 3.5 and Model 9-12 (Competing risks) in Table 3.6 shows general and specific human capital interactions.

Hypotheses were tested in ten models (excluding models 2 and 4 which were on the profitable outcome), as reported in Tables 3.3 to 3.6. Table 3.3 presents the results of the Cox hazard model allowing us to test the influence that our variable of main interest has on entrepreneurial persistence (duration to exit). Reported hazard ratios (HRs) above 1 indicate a higher incidence of entrepreneurial exit in a shorter duration, and HR below 1 indicates the reverse, that is, a lower incidence of exit and longer duration.

The results of the Cox proportional hazard model and competing risks model are presented below, where the dependent variable was the entrepreneurial exit. The table shows both the hazard ratios and the coefficient estimates.

Table 3.3 Cox regression model

	(1) - Outcome Quit		(2) - Outcome Profit	
VARIABLES	HR (QUIT)	Cox	HR (PROFIT)	Cox
Educational Attainment (Baseline: Up to HS degree)				
Post-HS, no BA degree	0.828	-0.189***	1.071	0.068*
		(0.029)		(0.038)
College Degree	1.168	0.155***	0.848	-0.165***
		(0.032)		(0.044)
Graduate experience, degree	0.906	-0.099**	1.027	0.027
		(0.039)		(0.046)
Work Experience (Baseline: No work Experience)				
Have work Experience	0.799	-0.225**	1.625	0.486***
		(0.087)		(0.144)
Startup Experience (Baseline: No StartupExp)				
Have Startup Experience	0.982	-0.018	1.096	0.091***
		(0.024)		(0.028)
Industry Experience (Baseline: No IndustryExp)				
Have Industry Experience	0.771	-0.260***	0.922	-0.081**
		(0.025)		(0.033)
Age	0.956	-0.045***	1.043	0.043***
		(0.008)		(0.011)
c.Age#c.Age	1.001	0.001***	1.000	-0.000***
		(0.000)		(0.000)
Age Groups (Baseline: 18-36 years)				
37-55	1.030	0.030	0.716	-0.334***
		(0.048)		(0.056)
56-74	0.621	-0.476***	0.678	-0.389***
		(0.082)		(0.094)
Business Idea (Baseline: No Business Idea)				
Business Idea (had business idea)	0.881	-0.127***	0.904	-0.101***
		(0.031)		(0.036)
Sector (Baseline: Non-hi-tech)				
High-tech	0.910	-0.094***	1.017	0.017
		(0.026)		(0.031)
Gender (Baseline: Male)				
Female	1.167	0.154***	0.821	-0.197***
		(0.023)		(0.028)
Team Size (Baseline: One owner)				
Two owners/team members	0.925	-0.078***	1.053	0.052*
		(0.025)		(0.029)
Three owners/team members	1.085	0.081*	0.926	-0.077
		(0.045)		(0.064)
Four owners/team members	0.798	-0.225***	1.176	0.162**
		(0.060)		(0.066)
Five or more owners/team members	1.054	0.052	2.273	0.821***
		(0.116)		(0.081)
Time Devotion (Baseline: Not F/T)				
Full Time Basis	0.998	-0.002***	1.003	0.003***
		(0.000)		(0.000)
Invested Own Money (Baseline: No)				
Invested own money - Yes	1.001	0.001**	0.999	-0.001*
		(0.000)		(0.001)
External Funding (Baseline: Not Received)				
External Funding Received	0.996	-0.004***	1.003	0.003***
		(0.000)		(0.000)
Initial Sales/Revenue/Income (Baseline: Not made)				
Initial Sales/Revenue/Income - Made	0.995	-0.005***	1.021	0.021***
		(0.000)		(0.001)
Growth Preference (Baseline: Easy to manage)				
Maximise firm growth	0.959	-0.041	0.728	-0.317***
		(0.029)		(0.037)
Business Plan Initiated (Baseline: No)				
Business Plan Initiated - Yes	1.000	0.000	1.003	0.003***
		(0.000)		(0.000)
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)				
Entrepreneurial Desire (had entrepreneurial desire)	0.972	-0.028	1.090	0.086***
		(0.025)		(0.032)
Project (Baseline: PSED II)				
US PSED I	0.455	-0.787***	1.292	0.256***
		(0.031)		(0.031)
Observations		39,096		39,096
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 3.4 Competing risks model

VARIABLES	(3) - Quit (competing with Profit) SHR (Quit)	Competing Risk	(4) - Profit (competing with Quit) SHR (Profit)	Competing Risk
Educational Attainment (Baseline: Up to HS degree)				
Post-HS, no BA degree	0.809	-0.212***	1.151	0.141***
		(0.028)		(0.037)
College Degree	1.194	0.178***	0.867	-0.143***
		(0.031)		(0.041)
Graduate experience, degree	0.891	-0.116***	1.091	0.087**
		(0.037)		(0.044)
Work Experience (Baseline: No work Experience)				
Have work Experience	0.820	-0.199**	1.735	0.551***
		(0.097)		(0.147)
Startup Experience (Baseline: No StartupExp)				
Have Startup Experience	0.965	-0.036	1.096	0.092***
		(0.023)		(0.027)
Industry Experience (Baseline: No IndustryExp)				
Have Industry Experience	0.791	-0.235***	0.971	-0.029
		(0.024)		(0.032)
Age	0.952	-0.049***	1.060	0.059***
		(0.008)		(0.011)
c.Age#c.Age	1.001	0.001***	0.999	-0.001***
		(0.000)		(0.000)
Age Groups (Baseline: 18-36 years)				
37-55	1.075	0.072	0.663	-0.411***
		(0.045)		(0.056)
56-74	0.653	-0.427***	0.686	-0.377***
		(0.080)		(0.091)
Business Idea (Baseline: No Business Idea)				
Business Idea	0.871	-0.138***	0.924	-0.079**
		(0.030)		(0.035)
Sector (Baseline: Non-hi-tech)				
High-tech	0.925	-0.077***	1.002	0.002
		(0.026)		(0.029)
Gender (Baseline: Male)				
Female	1.184	0.169***	0.789	-0.237***
		(0.022)		(0.027)
Team Size (Baseline: One owner)				
Two owners/team members	0.921	-0.083***	1.085	0.081***
		(0.024)		(0.028)
Three owners/team members	1.110	0.104**	0.933	-0.069
		(0.044)		(0.062)
Four owners/team members	0.781	-0.247***	1.234	0.210***
		(0.057)		(0.066)
Five or more owners/team members	0.844	-0.170	2.402	0.876***
		(0.110)		(0.076)
Time Devotion (Baseline: Not F/T)				
Full Time Basis	0.998	-0.002***	1.003	0.003***
		(0.000)		(0.000)
Invested Own Money (Baseline: No)				
Invested own money - Yes	1.001	0.001***	0.999	-0.001
		(0.000)		(0.001)
External Funding (Baseline: Not Received)				
External Funding Received	0.996	-0.004***	1.003	0.003***
		(0.000)		(0.000)
Initial Sales/Revenue/Income (Baseline: Not made)				
Initial Sales/Revenue/Income - Made	0.992	-0.008***	1.022	0.022***
		(0.000)		(0.001)
Growth Preference (Baseline: Easy to manage)				
Maximise firm growth	1.001	0.001	0.721	-0.328***
		(0.027)		(0.037)
Business Plan Initiated (Baseline: No)				
Business Plan Initiated - Yes	1.000	-0.000	1.003	0.003***
		(0.000)		(0.000)
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)				
Entrepreneurial Desire (had entrepreneurial desire)	0.939	-0.063***	1.089	0.086***
		(0.024)		(0.031)
Project (Baseline: PSED II)				
US PSED I	0.427	-0.852***	1.476	0.389***
		(0.030)		(0.030)
Observations		39,096		39,096
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

From models 3 (Cox model) and 4 (Competing risks model), the results and significant and demonstrate that individuals with work experience (H1b) and individuals with industry experience are less likely to exit early, therefore, both H1b and H1d are supported. Regarding H1a, which stated that individuals with higher educational attainment are less likely to exit early, my hypothesis is partially supported because there is no linear relationship. Although degree holders are less likely (results are significant) to exit early but so do the individual with post-high secondary school. I do not find support (results not significant) for H1c, which stated that individuals with prior start-ups are less likely to exit early. The results support H1e, which stated that older entrepreneurs would have better persistence and are less likely to exit early, and therefore I accept H1e.

Tables 3.5 and 3.6: General and Specific Human capital interaction models (5-12)

Human capital interactions are tested in Model 5-8 (Table 5: Cox) and Model 9-12 (Table 6: Competing risks). H2a predicts that individuals with higher educational attainment and start-up experience will be less likely to exit early. I found support from both models and therefore accept H2a. H2b predicts that individuals with work experience and start-up experience will be less likely to exit early. The results (significant) from the competing risks model support H2b. H2c predicts that individuals with higher educational attainment and prior industry experience will be less likely to exit early. H2d predicts that individuals with work experience and prior industry experience will be less likely to exit early. The results from both models are significant and support H2d.

Table 3.5 Cox regression model (Human Capital Interactions)

VARIABLES	(5) - Outcome Quit HR (QUIT)	Cox	(6) - Outcome Quit HR (QUIT)	Cox	(7) - Outcome Quit HR (QUIT)	Cox	(8) - Outcome Quit HR (QUIT)	Cox
Educational Attainment (Baseline: Up to HS degree)								
Post-HS, no BA degree	0.736	-0.306***	0.733	-0.311***	0.827	-0.190***	0.82	-0.198***
		(0.037)		(0.050)		(0.029)		(0.029)
College Degree	1.229	0.206***	0.908	-0.096*	1.167	0.154***	1.167	0.155***
		(0.041)		(0.058)		(0.032)		(0.032)
Graduate experience, degree	1.04	0.039	0.869	-0.140**	0.904	-0.100***	0.900	-0.105***
		(0.052)		(0.066)		(0.039)		(0.039)
Work Experience (Baseline: No work Experience)								
Have work Experience	0.782	-0.246***	0.798	-0.226***	0.852	-0.161	4.607	1.528***
		(0.088)		(0.087)		(0.098)		(0.304)
Startup Experience (Baseline: No StartupExp)								
Have Startup Experience	0.936	-0.066	0.983	-0.017	1.343	0.295	0.986	-0.015
		(0.050)		(0.024)		(0.202)		(0.024)
Industry Experience (Baseline: No IndustryExp)								
Have Industry Experience	0.772	-0.258***	0.661	-0.415***	0.772	-0.259***	6.917	1.934***
		(0.025)		(0.045)		(0.025)		(0.314)
Age	0.955	-0.046***	0.959	-0.042***	0.955	-0.046***	0.957	-0.044***
		(0.008)		(0.008)		(0.008)		(0.008)
c.Age#c.Age	1.001	0.001***	1.001	0.001***	1.001	0.001***	1.001	0.001***
		(0.000)		(0.000)		(0.000)		(0.000)
Age Groups (Baseline: 18-36 years)								
37-55	1.019	0.019	1.029	0.028	1.034	0.034	1.028	0.027
		(0.048)		(0.048)		(0.048)		(0.048)
56-74	0.606	-0.501***	0.627	-0.467***	0.623	-0.474***	0.622	-0.475***
		(0.083)		(0.083)		(0.082)		(0.082)
Business Idea (Baseline: No Business Idea)								
Business Idea (had business idea)	0.877	-0.131***	0.875	-0.133***	0.882	-0.126***	0.886	-0.122***
		(0.031)		(0.031)		(0.031)		(0.031)
Interactions (General and Specific Human Capital)								
EduAttainment#StartupExp								
Post-HS, no BA degree # Have Startup Experience	1.317	0.276***						
		(0.062)						
College Degree # Have Startup Experience	0.921	-0.082						
		(0.066)						
Graduate experience, degree # Have Startup Experience	0.799	-0.225***						
		(0.078)						
EduAttainment#IndustryExp								
Post-HS, no BA degree # Have Industry Experience			1.202	0.184***				
				(0.061)				
College Degree # Have Industry Experience			1.431	0.358***				
				(0.068)				
Graduate experience, degree # Have Industry Experience			1.071	0.068				
				(0.079)				

VARIABLES	(5) - Outcome Quit HR (QUIT)	Cox	(6) - Outcome Quit HR (QUIT)	Cox	(7) - Outcome Quit HR (QUIT)	Cox	(8) - Outcome Quit HR (QUIT)	Cox
WorkExp#StartupExp								
Work Experience # Have Startup Experience					0.729	-0.316		
						(0.203)		
WorkExp#IndustryExp								
Work Experience # Have Industry Experience							0.108	-2.225***
								(0.315)
Sector (Baseline: Non-hi-tech)								
High-tech	0.906	-0.099***	0.915	-0.089***	0.909	-0.096***	0.924	-0.079***
		(0.026)		(0.026)		(0.026)		(0.026)
Gender (Baseline: Male)								
Female	1.162	0.150***	1.173	0.160***	1.167	0.154***	1.173	0.160***
		(0.023)		(0.023)		(0.023)		(0.023)
Team Size (Baseline: One owner)								
Two owners/team members	0.919	-0.084***	0.930	-0.072***	0.925	-0.078***	0.922	-0.081***
		(0.025)		(0.025)		(0.025)		(0.025)
Three owners/team members	1.088	0.085*	1.098	0.093**	1.084	0.081*	1.063	0.061
		(0.045)		(0.046)		(0.045)		(0.046)
Four owners/team members	0.793	-0.225***	0.796	-0.228***	0.799	-0.224***	0.780	-0.249***
		(0.060)		(0.060)		(0.060)		(0.060)
Five or more owners/team members	1.06	0.059	1.070	0.068	1.056	0.054	1.056	0.054
		(0.117)		(0.117)		(0.116)		(0.116)
Time Devotion (Baseline: Not F/T)								
Full Time Basis	0.998	-0.002***	0.998	-0.002***	0.998	-0.002***	0.998	-0.002***
		(0.000)		(0.000)		(0.000)		(0.000)
Invested Own Money (Baseline: No)								
Invested own money - Yes	1.001	0.001**	1.001	0.001***	1.001	0.001**	1.001	0.001***
		(0.000)		(0.000)		(0.000)		(0.000)
External Funding (Baseline: Not Received)								
External Funding Received	0.996	-0.004***	0.996	-0.004***	0.996	-0.004***	0.996	-0.004***
		(0.000)		(0.000)		(0.000)		(0.000)
Initial Sales/Revenue/Income (Baseline: Not made)								
Initial Sales/Revenue/Income - Made	0.995	-0.005***	0.995	-0.005***	0.995	-0.005***	0.995	-0.005***
		(0.000)		(0.000)		(0.000)		(0.000)
Growth Preference (Baseline: Easy to manage)								
Maximise firm growth	0.953	-0.048*	0.961	-0.040	0.959	-0.042	0.957	-0.044
		(0.029)		(0.029)		(0.029)		(0.029)
Business Plan Initiated (Baseline: No)								
Business Plan Initiated - Yes	1.000	-0.000	1.000	-0.000	1.000	0.000	1.000	-0.000
		(0.000)		(0.000)		(0.000)		(0.000)
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)								
Entrepreneurial Desire (had entrepreneurial desire)	0.978	-0.022	0.972	-0.028	0.972	-0.028	0.976	-0.024
		(0.025)		(0.025)		(0.025)		(0.025)
Project (Baseline: PSED II)								
US PSED I	0.454	-0.790***	0.454	-0.790***	0.454	-0.789***	0.449	-0.800***
		(0.031)		(0.031)		(0.031)		(0.031)
Observations		39,096		39,096		39,096		39,096
Standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 3.6 Competing risks model (Human Capital Interactions)

VARIABLES	(9) - Quit (competing with Profit) SHR (Quit)	(9) - Quit (competing with Profit) Competing Risk	(10) - Quit (competing with Profit) SHR (Quit)	(10) - Quit (competing with Profit) Competing Risk	(11) - Quit (competing with Profit) SHR (Quit)	(11) - Quit (competing with Profit) Competing Risk	(12) - Quit (competing with Profit) SHR (Quit)	(12) - Quit (competing with Profit) Competing Risk
Educational Attainment (Baseline: Up to HS degree)								
Post-HS, no BA degree	0.721	-0.328***	0.735	-0.308***	0.807	-0.214***	0.799	-0.224***
		(0.036)		(0.050)		(0.028)		(0.028)
College Degree	1.282	0.248***	0.955	-0.046	1.192	0.175***	1.191	0.175***
		(0.039)		(0.056)		(0.031)		(0.031)
Graduate experience, degree	1.011	0.011	0.884	-0.123**	0.888	-0.118***	0.883	-0.124***
		(0.049)		(0.063)		(0.037)		(0.037)
Work Experience (Baseline: No work Experience)								
Have work Experience	0.799	-0.225**	0.826	-0.191*	0.923	-0.080	6.115	1.811***
		(0.098)		(0.099)		(0.110)		(0.316)
Startup Experience (Baseline: No StartupExp)								
Have Startup Experience	0.932	-0.071	0.966	-0.035	1.846	0.613***	0.968	-0.033
		(0.049)		(0.023)		(0.205)		(0.023)
Industry Experience (Baseline: No IndustryExp)								
Have Industry Experience	0.791	-0.235***	0.698	-0.360***	0.791	-0.235***	11.183	2.414***
		(0.024)		(0.045)		(0.024)		(0.322)
Age	0.952	-0.050***	0.954	-0.047***	0.950	-0.051***	0.952	-0.049***
		(0.008)		(0.008)		(0.008)		(0.008)
c.Age#c.Age	1.001	0.001***	1.001	0.001***	1.001	0.001***	1.001	0.001***
		(0.000)		(0.000)		(0.000)		(0.000)
Age Groups (Baseline: 18-36 years)								
37-55	1.065	0.063	1.075	0.072	1.082	0.079*	1.077	0.074
		(0.045)		(0.046)		(0.045)		(0.046)
56-74	0.636	-0.452***	0.658	-0.418***	0.655	-0.422***	0.654	-0.424***
		(0.080)		(0.080)		(0.080)		(0.080)
Business Idea (Baseline: No Business Idea)								
Business Idea	0.870	-0.139***	0.866	-0.144***	0.873	-0.136***	0.879	-0.129***
		(0.030)		(0.030)		(0.030)		(0.031)
Interactions (General and Specific Human Capital)								
EduAttainment#StartupExp								
Post-HS, no BA degree # Have Startup Experience	1.308	0.268***						
		(0.060)						
College Degree # Have Startup Experience	0.878	-0.130**						
		(0.064)						
Graduate experience, degree # Have Startup Experience	0.807	-0.215***						
		(0.074)						
EduAttainment#IndustryExp								
Post-HS, no BA degree # Have Industry Experience			1.156	0.145**				
				(0.060)				
College Degree # Have Industry Experience			1.374	0.317***				
				(0.066)				
Graduate experience, degree # Have Industry Experience			1.019	0.018				
				(0.076)				

VARIABLES	(9) - Quit (competing with Profit) SHR (Quit)	Competing Risk	(10) - Quit (competing with Profit) SHR (Quit)	Competing Risk	(11) - Quit (competing with Profit) SHR (Quit)	Competing Risk	(12) - Quit (competing with Profit) SHR (Quit)	Competing Risk
WorkExp#StartupExp								
Work Experience # Have Startup Experience					0.520	-0.654***		
						(0.206)		
WorkExp#IndustryExp								
Work Experience # Have Industry Experience							0.068	-2.691***
								(0.323)
Sector (Baseline: Non-hi-tech)								
High-tech	0.919	-0.084***	0.931	-0.071***	0.922	-0.081***	0.941	-0.060**
		(0.026)		(0.026)		(0.026)		(0.026)
Gender (Baseline: Male)								
Female	1.179	0.164***	1.189	0.173***	1.185	0.169***	1.195	0.178***
		(0.022)		(0.022)		(0.022)		(0.022)
Team Size (Baseline: One owner)								
Two owners/team members	0.916	-0.087***	0.925	-0.077***	0.921	-0.082***	0.917	-0.087***
		(0.024)		(0.024)		(0.024)		(0.024)
Three owners/team members	1.111	0.106**	1.118	0.112**	1.108	0.103**	1.081	0.078*
		(0.044)		(0.044)		(0.044)		(0.043)
Four owners/team members	0.781	-0.248***	0.777	-0.252***	0.784	-0.244***	0.754	-0.282***
		(0.058)		(0.058)		(0.057)		(0.059)
Five or more owners/team members	0.859	-0.152	0.867	-0.143	0.848	-0.165	0.848	-0.165
		(0.108)		(0.110)		(0.110)		(0.110)
Time Devotion (Baseline: Not F/T)								
Full Time Basis	0.998	-0.002***	0.998	-0.002***	0.998	-0.002***	0.998	-0.002***
		(0.000)		(0.000)		(0.000)		(0.000)
Invested Own Money (Baseline: No)								
Invested own money - Yes	1.001	0.001***	1.001	0.001***	1.001	0.001***	1.001	0.001***
		(0.000)		(0.000)		(0.000)		(0.000)
External Funding (Baseline: Not Received)								
External Funding Received	0.996	-0.004***	0.996	-0.004***	0.996	-0.004***	0.996	-0.004***
		(0.000)		(0.000)		(0.000)		(0.000)
Initial Sales/Revenue/Income (Baseline: Not made)								
Initial Sales/Revenue/Income - Made	0.992	-0.008***	0.992	-0.008***	0.992	-0.008***	0.992	-0.008***
		(0.000)		(0.000)		(0.000)		(0.000)
Growth Preference (Baseline: Easy to manage)								
Maximise firm growth	0.999	-0.001	1.003	0.003	1.000	-0.000	0.994	-0.006
		(0.027)		(0.028)		(0.028)		(0.027)
Business Plan Initiated (Baseline: No)								
Business Plan Initiated - Yes	0.999	-0.000	1.000	-0.000	1.000	-0.000	1.000	-0.000
		(0.000)		(0.000)		(0.000)		(0.000)
Entrepreneurial Desire (Baseline: No entrepreneurial Desire)								
Entrepreneurial Desire (had entrepreneurial desire)	0.945	-0.057**	0.940	-0.062***	0.939	-0.062***	0.943	-0.059**
		(0.024)		(0.024)		(0.024)		(0.024)
Project (Baseline: PSED II)								
US PSED I	0.426	-0.853***	0.426	-0.854***	0.425	-0.856***	0.418	-0.871***
		(0.030)		(0.030)		(0.030)		(0.030)
Observations		39,096		39,096		39,096		39,096
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

3.6 Discussion and conclusion

Educational attainment level and duration to exit

Nascent entrepreneurs with a non-college degree or a graduate degree have a lower likelihood of an early exit. These results partially support arguments that higher educational attainment can aid favourable assessment of a new venture's growth opportunities (Capelleras et al., 2019) and can positively affect venture outcomes (Hogendoorn, Groot and Van den Brink, 2019), which can delay the possibility of entrepreneurial exit. This interesting finding can be best explained by the human capital theory and Jovanovic's model. Pre-entry human capital equips founders with better analytical and decision-making skills, and networks developed through university education, but also exposes them to better opportunities for alternative employment. This could make them efficiently decide on available options, one being whether to disengage or not. Similarly, the post-entry realisation of their human capital and abilities, based on market feedback (i.e. the role of learning, Jovanovic's model) helps them to make a timely decision on their disengagement from the entrepreneurial process.

Work experience and duration to exit

Founders with work experience have a lower likelihood of an early exit. These results support arguments that founders' prior work experience benefits them from better organisation skills and provides better insight into customer and market dynamics (Gabrielsson and Politis, 2012). As prior work experience helps in accumulating a variety of skills in different roles (Krieger, Block and Stuetzer, 2018) including functional skills (Hsieh, 2016), together with better customer and market insight, deter exit likelihood and these nascent entrepreneurs are less likely to exit early. The results suggest that indeed work experience can be a double-edged sword and on one hand, provide knowledge and social capital advantages, but on the other hand, can contribute to an early exit because of the opportunity costs related to regular employment opportunities available to founders with work experience (Merida and Rocha, 2021).

Prior start-up experience and duration to exit

Founders with prior start-up experience have a marginally lower likelihood of an early exit but the results were not significant, which suggests that previous entrepreneurial experiences could differ in context and outcome and therefore the impact on the new venture process could be different (Zhao and Smallbone, 2019). These results are also in line with the finding by Grilli (2010) whereby the impact of entrepreneurial experience on venture exit was negative and statistically insignificant.

Industry experience and duration to exit

Founders with prior industry experience have a lower likelihood of an early exit, which is in line with Tietz, Lejarraga and Pindard-lejarraga (2020) and Dimov's (2010) findings on the positive effect of industry experience on entrepreneurial persistence, which means lower likelihood of an early exit.

Nascent entrepreneur's Age and duration to exit

Nascent entrepreneur age, as a categorical variable against the base group, the oldest age group (56-74) tends to benefit more in terms of entrepreneurial persistence and is less likely to quit early. These findings are in line with Cueto, Suárez and Mayor's (2020) findings on entrepreneurs' age being positively related to venture survival rates. Older founders may also be not ready to accept the sunk cost and hence not willing to make an earlier exit decision (DeTienne and Cardon, 2012). Moreover, older founders continue with venture creation as this is their opportunity to keep using their skills acquired over the years, and remain socially active (Viljamaa, Joensuu-Salo and Kangas, 2021).

Human Capital factor Interactions

One of my novel contributions to entrepreneurial exit research is that I have empirically tested general-specific human capital interactions to show how founders with higher human capital tend to benefit from applying their learning which has a significant and positive effect on the likelihood of disengagement from the process. The effect of these complementarities is a result of these human capital factors collectively providing founders with higher transferability of knowledge, skills, and learning, hence delaying the likelihood of an exit. Moreover, the complementarities point to the situational characteristics (Wolfson and Mathieu, 2018) of these founders. The only exception was those founders who have higher educational attainment and prior industry experience, which suggest that they are more in demand from the industry/alternative employment opportunities and could decide to opt for lucrative offers from the network they have established through their academic and/or industry career.

3.6.1 Limitations and outlook (directions for future research)

This study is not without limitations. Harmonized PSED only includes gestation activities that appear in both of the original data sets, which can result in some underestimation of process duration (Shim and Davidsson, 2018). However, despite the limitations, this study is believed to be a correct description of the duration estimates, in context to the human capital indicators, for a majority of nascent entrepreneurs involved in the entrepreneurial process. Further studies can apply a wider set of factors (e.g. subsidies, emergency funding in the pandemic for

founders, and the impact of incubators and accelerators) that can influence a founder's behaviour and have an impact on the duration of the founder's exit. Future studies can also attempt to study the accumulative effect of founding teams on the likelihood and duration of entrepreneurial exit. Having said that, my study focuses on the founder's human capital and age could be extended to explain the entrepreneurial team exit (Wennberg *et al.*, 2010) duration.

3.6.2 Implications and Conclusion

Insight into the factors behind nascent entrepreneurs' decision to disengage from the entrepreneurial process is a rather less researched area but can benefit future venture creation attempts to understand the founder's cost and benefits associated with the duration to exit decisions (Yamakawa, Peng and Deeds, 2015). In this chapter, I have therefore detangled both pre-entry human capital and post-entry learning of a venture's potential to better understand what causes nascent entrepreneurs' exit decisions and the duration of those decisions.

The chapter has attempted to advance our understanding of entrepreneurial exit by adopting a dynamic view taking into consideration the timing (duration) of entrepreneurial outcomes and looking at the evolution of this relationship between our variables of interests, over time, as suggested by Lévesque and Stephan (2020). I have four contributions to the field of entrepreneurial exit, First, by drawing on the Human Capital theory (Becker, 1964), I draw on and integrate literature and reconcile contradictory findings on how different types of human capital impact the founder's exit (i.e. founder choosing to leave the entrepreneurial process). I demonstrate that nascent entrepreneurs' higher educational attainment, work experience, and prior industry experience reduce the hazard rate for an early exit, which adds to the predictive power of the human capital theory in terms of lower risk of an early founder's exit. Moreover, older founders are least likely to exit early. These results are particularly relevant for policymakers in building policy initiatives around education and apprenticeship schemes to provide individuals with both general and specific human capital and also design support mechanisms (e.g. government-backed start-up loan schemes) tailored around nascent entrepreneurs. These insights can also be helpful for practitioners (e.g. financial institutions, bankers, crowdfunding, seed funding providers, and angel investors) who struggle to pick winners (Warhuus, Frid and Gartner, 2021) based on the founder's human capital (Ko and McKelvie, 2018) and can refine their risk models (for evaluating proposals) based on human capital, age and exit likelihood and duration to exit.

Second, I draw on and integrate literature streams on the role of human capital (both general and specific and their interactions) in duration to founder's exit, which has lacked both in terms of theory and measures of founder exit as an entrepreneurial process outcome (Strese *et al.*, 2018). From the theory point of view, I have shown how the founder's pre-entry human capital delays the duration to exit, and post-entry realisation of their human capital, helps these founders to efficiently voluntarily decide to disengage from the entrepreneurial process, minimising both personal and societal costs. Moreover, older founders are less likely to exit in a shorter duration, showing two effects in action again. First, they would have fewer external employment opportunities and second, they would benefit from the accumulated experience that will deter chances of an early exit.

Third, the methodological contribution in terms of the use of longitudinal research design (Hanage *et al.*, 2021) and accounting for the competing risks (i.e. the possibility of a profitable outcome) when studying entrepreneurial process outcomes provides a nuanced approach that contributes toward the longitudinal research on nascent entrepreneurs (Belchior and Roisin, 2021) and founder's exit (Wennberg and DeTienne, 2014). It is hoped that the insights that I have presented in this chapter will stimulate research interest in studying entrepreneurial exit from the duration perspective (i.e. entrepreneurial persistence/likelihood of a delayed exit), particularly important in recent times (pandemic), as all stakeholders in an ecosystem would need to access their interventions (Brown and Rocha, 2020) not only from a venture viability point of view but also duration perspective. This is because such a temporal freeze on start-up activities would mean a different level of challenges for founders with different human capital levels and therefore context-specific entrepreneurial action guidance would be required (Giones *et al.*, 2020) to help nascent entrepreneurs in making efficient exit decisions so that both the social and economic costs can be managed.

Finally, I have provided a better insight into the contingent nature and relationships of human capital factors and age, whereby a dual mechanism appears to drive the founder's exit decisions. From a human capital perspective, higher human capital delays the likelihood of an early exit, except for prior start-up experience. However, founders with higher educational attainment and prior start-up experience tend to delay the likelihood of an exit. In terms of prior work experience, both prior industry and prior start-up experiences have a greater complementary impact. The study also overcomes a binary typology in which entrepreneurial exit is considered negative and venture survival is considered a success due to entrepreneurs' human capital, age, and start-up type factors.

Chapter 4: Spatial scope of sales and duration of a profitable venture creation: One size (human capital) fits all doesn't work!

Abstract

This chapter examines the impact of nascent entrepreneurs' human capital, both general (education) and specific (prior start-up experience) on the duration of a profitable venture creation duration with different spatial scopes of sales. The chapter argues why a founder's higher knowledge may be associated with a shorter duration of the entrepreneurial process to a profitable internationalisation as an outcome. The chapter tests hypotheses with nested models with dependent variables corresponding to venture creation duration with regional, national and international, then national and above, and next international spatial scope of sales. Using the harmonised PSED (US cohorts) dataset, and applying competing risks Cox models, the chapter finds that higher educational attainment shines through being associated with the fastest venture creation process towards a profitable outcome, for all spatial scopes of sales, and prior start-up experience helps considerably in the case of the international spatial scope of sales. The chapter emphasises 'fast learning' and the 'ability to efficiently utilise one's human capital', for theorisation on the spatial scope of sales and internationalisation.

Keywords: Entrepreneurial process, Human Capital, Duration study, Cross-border Firms, Internationalisation, Panel Study of Entrepreneurial Dynamics (PSED)

4.1 Introduction

In recent years, business creation and the geographic scope of activities have changed drastically, and researchers have been trying to better explain the geographical aspect of entrepreneurship (Jafari Sadeghi *et al.*, 2019). Expanding spatial scope can assist ventures with product innovation through external innovation complementarities, reducing associated search costs, and increasing the knowledge pool (Leonidou *et al.*, 2020). Moreover, a wider spatial scope exposes founders to a larger network of people and entrepreneurs, which can be a source of current business insights from diverse geographical markets, facilitating efficient decision-making (Dileo and García Pereiro, 2019). The geographic scope of entrepreneurial activity has been argued as an important area for further studies, because on one hand, it may help achieve financial performance and spread start-up costs (Spence and Crick, 2006), but on the other hand, it may delay profitability due to need for recovery of higher initial investment (García-Cabrera, García-Soto and Olivares-Mesa, 2019). Shepherd and Patzelt (2021) have argued that entrepreneurs may therefore limit their geographic scope to home regions to avoid travel time and financial costs, and therefore, an entrepreneur's decision to pursue a geographic expansion opportunity would depend upon the conditions associated with a wider spatial scope (Mainela, Puhakka and Sipola, 2018). New start-ups in particular tend to keep a narrower spatial scope during the entrepreneurial process (Karlsson and Dahlberg, 2003) and are more selective on the type of customers in the first few years, except for individuals with higher human capital (educational attainment) who enjoy a variety of networks than entrepreneurs with a lower human capital (Schutjens and Stam, 2003). It is therefore important to study how nascent entrepreneurs benefit from their human capital in terms of establishing a profitable new venture in different spatial scopes.

In terms of the spatial scope, ventures are faced with the liability of foreignness, which requires them to be more efficient than their competitors, but on the same hand, through export activities, these firm benefits from learning from foreign competitors, enhance their productivity by cutting costs and better product development (Estrin, Korosteleva and Mickiewicz, 2020). Although attempts, both recent and in the past, have been made on the event-based perspective of entrepreneurship but they were studied as meso-level events (e.g. rate of firms dissolution) from the geographic scope and duration perspective (Rauch and Hulsink, 2021) and even when researching spatial scope and performance has been mostly on the firm-level and resources, and on multi-national organisations (Oh, Kim and Shin, 2019; Verbeke and Asmussen, 2016; Asmussen, 2009; Goerzen and Beamish, 2003). To my knowledge, no comprehensive empirical study on the micro-level (founder's human capital), spatial scope of sales, and duration to a profitable venture creation has been undertaken. Even when the

duration to a successful venture creation outcome has been studied, it has been based on the gestation activities (Shim and Davidsson, 2018) and not on the human capital factors. It is important from theory building perspective to better understand and explain (Crane *et al.*, 2016) how human capital factors can explain the venture creation process outcome with different spatial scopes. Furthermore, in this chapter by focusing on the founder (individual) level and time perspective of a successful venture creation at a different spatial scope of sales, I have attempted to enrich entrepreneurship research in terms of the founder's resilience (i.e. competing risks of leaving the entrepreneurial process), competitive advantage, and duration to a profitable venture creation (Lévesque and Stephan, 2020). Moreover, this chapter will provide clarity on which of the human capital factors can contribute toward faster learning, and an early profitable outcome because it has been suggested that the process of spatial scope (internationalisation) tend to benefit from learning through networks (Sharma and Blomstermo, 2003b). A recent attempt was made in international business literature to study both the time and context in terms of network (spatial scope) development (Berns, Gondo and Sellar, 2021) but from clusters firms' networks perspective, and hence leaving gap to study the vital role of human capital can plays in understanding why certain ventures outperform others (Thomas and Murphy, 2019).

Research has also suggested that experience in the local entrepreneurial ecosystem, which is part of the larger (i.e. regional, national, international) ecosystem, can also benefit from expansion over a wider spatial scope (Bruns *et al.*, 2017). However, a wider spatial scope (e.g. national) might also present challenges (e.g. location and selection of suppliers, handling higher complexity of task completion) related to the increased diversity of entrepreneurial activities (Vuong, 2016; Demeter, 2013). I have therefore attempted to study duration to a profitable outcome from a much wider perspective (i.e. regional, national, and international).

Similarly, international business research has also considered the speed of internationalisation as the main factor (Katz, Renko and Kundu, 2021) and it has been argued that smaller ventures may not have the necessary resources to internationalise in a shorter period of time and they might first expand their spatial scope up to the borders (Jørgensen, 2014). Therefore, the need to understand the spatial scope and entrepreneurial internationalisation processes by focusing on the individual (human) factors have been highlighted (Elo *et al.*, 2018). This is important because various nascent entrepreneurs process information about the surroundings (spatial scope) differently and also differ in terms of their resource allocation patterns (Alomani, Baptista and Athreye, 2022) and such resources constraints can then lead ventures to expand in the home markets before going international (Wadeson, 2020), which may at the same time go against nascent entrepreneurs preference for shorter duration to profitability (Reynolds, 2018). My attempt to disentangle the impact of

different human capital on the duration to profit at different spatial scopes of sales would facilitate researchers and policymakers to design specific interventions that can better support nascent entrepreneurs' geographical expansion plans. This is important because researchers and practitioners have been keen to better understand how start-ups are initiated, maintained, and how they increase the spatial scope (Debrulle and Maes, 2015) but venture's spatial scope at different levels (e.g. regional vs. national vs. global) and its effect on venture outcome (performance) has been rarely investigated (Patel, Criaco and Naldi, 2018).

International entrepreneurship research has examined human capital and entrepreneurial process outcomes (Terjesen, Hessels and Li, 2016). International entrepreneurship studies have considered human capital as a key intangible resource for new venture internationalisation (Yavuz, 2021) but research has produced mixed findings. Human capital has been found to play a major role in the internationalisation speed of SMEs (Gassmann and Keupp, 2007; Morais and Ferreira, 2020). Founders with a high level of human capital are argued to be more likely to expand to different export markets (Felzensztein *et al.*, 2015). Del Sarto *et al.* (2021) found both human capital and export activity interact to enhance venture survival due to the effect of learning by exporting (Del Sarto *et al.*, 2021). However, Debrulle and Maes (2015) found no direct human capital advantage in exporting, and Del Sarto *et al.* (2021) found that a high level of human capital only has a contingent role on international/export activity and venture survival. Furthermore, research has found that different type of human capital affects geographical scoping differently. For example, the founder's general human capital (i.e. educational attainment) has a more persistent effect on the venture's export propensity and intensity than the specific human capital (Stucki, 2016). Human capital has also been found to be positively associated with early internationalisation (Onkelinx, Manolova and Edelman, 2016a).

Empirical research duration of internationalisation and its impact on venture outcome is scarce (Puig, Gonzalez-Loureiro and Ghauri, 2018) due to the construct related challenges on spatial scope and criteria of performance (Pangarkar, 2008; Morais and Ferreira, 2020). In this chapter, by adopting three levels of the spatial scope of sales, and a clear performance measure (i.e. speed to a profitable venture creation), I have attempted to introduce a human capital construct/mechanism to measure the likelihood of a shorter duration of launching a profitable venture, from different spatial scope perspective. I have also provided details on some of the relevant studies in the next section. This chapter will therefore attempt to fill the gap in the international business literature that has rarely studied both time duration and the spatial scope from the nascent entrepreneurs' human capital perspective (Berns, Gondo and Sellar, 2021) and how founder's human capital can accelerate their internationalisation efforts

through their ability to learn fast and utilise their human capital efficiently (Onkelinx, Manolova and Edelman, 2016b).

This chapter's research question is what effect does the founder's educational attainment and prior start-up experience have on the nascent entrepreneur's duration to a profitable venture creation at the different spatial scope of sales. The purpose of this chapter is therefore to provide new insight into how the nascent entrepreneur's duration to a profitable venture creation is supported by the founder's human capital while accounting for different spatial scopes of sales (i.e. regional, national and international, national and above, and international). This is done by factoring in differences in cross-border ventures that go international, but also cross-regional, as compared to more local ones. Among the few closely related papers include one by Ahmed and Brennan (2019) who studied the impact of a founder's human capital on internationalisation from the firms' perspective and also from a least-developed country's perspective; and one from Gruenhagen *et al.* (2018) who studied internationalisation of new ventures based on founder's human capital but from internal experience perspective only.

This chapter has three important contributions to the research on nascent entrepreneurship, spatial scope of sales, and duration to a profitable outcome. First, by shifting the focus from the frequently studied new firm internationalisation, the chapter provides fresh theoretical insight into how pre-entry factors (human capital of nascent entrepreneurs) impact their likelihood of creating a profitable venture in a shorter duration of time at the different spatial scopes of sales. The focus on human capital is not new, but most of the focus has been on the founder's or firm's prior international experience. Moreover, I have attempted to study a fine-graded distinction of scope (i.e. beyond international) by introducing a nested model on three levels of the spatial scope of sales. In doing so, the chapter corresponds to calls in the literature for investigations of venture outcomes and studying the effect of human capital factors from a geographical distance/location perspective (Huggins, Prokop and Thompson, 2017); and investigating the relationship between internationalisation speed and performance using longitudinal research design (Chetty, Johanson and Martín Martín, 2014). It is important because time is a limited and vital resource for nascent entrepreneurs as they are conscious of return on investment, both in terms of time and money, and many nascent entrepreneurs who invest considerable time into venture creation are never successful in creating one, with no chance to recover the sunk costs (Reynolds, 2018). Second, the chapter focus on the founder level as compared to the firm level and the speed of the creation of a profitable venture in a shorter period of time with different spatial scopes of sales. Research on a profitable outcome has predominately focused on contextual factors, and the founder's capacity to

reflect on the circumstances and act accordingly has been somewhat neglected (Kitching and Rouse, 2020). In particular, this will advance international entrepreneurship research by providing clarity on how born globals and international new ventures, with different/multiple spatial scopes of sales, can benefit from the founder's human capital. Finally, methodologically, my study demonstrates how the spatial scope effect can be incorporated into a nested model while testing for a relationship at the founder's human capital levels. By developing a nested model that cut across levels of analysis to enable theorising different level effects (Welter, 2011), I have also responded to the need to incorporate similar models in international business research (Elango and Wieland, 2017).

This chapter, therefore, responds to the calls for studying the speed of internationalisation by accounting for start-up founders' resources (i.e. founder's human capital in this study) to help advance theorisation, by validating the predictive power of human capital theory, in the literature on the speed of internationalisation (Mohr and Batsakis, 2019; Prashantham *et al.*, 2019; Chetty, Johanson and Martín Martín, 2014); and use finer-grained measures on how these factors impact internationalisation and failure probabilities (Meschi, Ricard and Tapia Moore, 2017). My key contribution is that I have attempted to replace the national-international dichotomy by introducing a more fine-grained space (nested model) in terms of the spatial scope by empirically testing beyond cross-border relations to understand more accurately how the spatial scope of sales/proximity and human capital factors impact nascent entrepreneurial process duration and outcome by using well-established hazard models to provide research clarity.

4.2 The Theoretical Framework and Hypothesis Development Section

Born Global / INVs

Individuals with higher human capital are quick at learning by exporting, which helps them in international expansion and can provide them with a time advantage (Del Sarto *et al.*, 2021) as they understand that initial sunk cost is part of the born global strategy and journey, which eventually enable them to reap profits relatively quicker by international expansion (Braunerhjelm and Halldin, 2019). However, the literature differentiates between internationalisation and born global, whereby internationalisation is a step-by-step (gradual) approach as compared to born global, also known as international new ventures (INVs), which is more rapid and tends to have a regional footprint than actually being global (Wadeson, 2020). Internationalisation, being a regional or incremental approach, is also believed to be a less risky and cost-saving strategy, whereas, born global is rapid international growth without having much of the local markets knowledge (Melén Hånell and Rovira Nordman, 2018). This

would imply that the spatial scope of sales that involves regional, national and international spatial scope would be more time-consuming but less risker than the international scope (born global), which would be relatively faster but riskier.

Duration studies

Duration of new ventures' broadened spatial scope of sales (e.g. internationalisation) is an interesting research area to study, particularly from a nascent entrepreneurship perspective because a shorter duration in the entrepreneurial process reduces sunk costs, and increases return on investment in time, and initial investments (Reynolds, 2018). Moreover, start-ups with limited resources, manage to successfully expand their footprint in the complex and dynamic international environment (Hagen, Zucchella and Ghauri, 2019), and therefore for the last three decades, research has focused on the antecedents and success of early internationalisation (Jiang *et al.*, 2020; Gruenhagen *et al.*, 2018). During the last two decades, in particular, research domains like entrepreneurship, strategic management, marketing, and international business has been focusing on speed to internationalisation (Paul and Rosado-Serrano, 2019) but why and what enables domestic entrepreneurs to engage in wider spatial scope of sales (e.g. international entry), and commit resources under higher uncertainty, and how this affects the duration dynamics (Bolzani and Foo, 2018) need to be explored. It has been argued that duration, the amount of time between the start and end of a process, if not considered adequately, runs a risk of not capturing the founder's (actor) contribution (agency) in shaping aspects of temporality (Aguinis and Bakker, 2021). Davidsson, Recker, and Von Briel (2020) argued that an inward-looking (agent's human capital) perspective is useful to explain how agents can deal with different environments (macroeconomic conditions and regulatory environments). However, earlier research has suggested the need to study duration as a dependent variable of the venture creation process because nascent entrepreneurs who manage to better organise their resources and start-up activities tend to have a shorter duration with a positive cash flow (Lichtenstein *et al.*, 2007). Furthermore, not considering time explicitly (i.e. theoretically and operationally) has hindered the theorisation of entrepreneurial process by which events (venture outcome) unfolds (Aguinis and Bakker, 2021) over a period of time.

Abdi and Aulakh (2018) studied the duration (operationalised by the number of years) of a venture's first cross-border sales and found that the relationship between duration to internationalisation and performance is mostly downward in shorter duration and gradually becomes positive as internationalisation duration increases. Their study was based on firm-specific (e.g. R&D, financial, and product diversification) contingent factors but not on any of

the human capital factors, not even as a control. Moreover, the speed of international footprint has predominantly been studied from the born global perspective, and mostly from the high-tech (service sector) start-ups (Hilmersson and Johanson, 2020), we, therefore, have limited insight into nascent entrepreneurship and duration to a successful venture creation from different spatial scope perspectives. It is important because new ventures internationalise by exporting but the understanding of the limitations and speed of establishing operations outside the home country has also remained limited (Katz, Renko and Kundu, 2021). Another challenge has been that most of the research's unit of study was firm (Del Sarto et al., 2021; Jiang et al., 2020; Puig, Gonzalez-Loureiro and Ghauri, 2018; Sadeghi, Rose and Chetty, 2018; Chetty, Johanson and Martín Martín, 2014; Musteen, Datta and Francis, 2014; Autio, George and Alexy, 2011) and not many have focused on founder level human capital which has been found critical in start-up internationalisation (Jiang et al., 2020). Even when attempts on studying the impact of human capital on speed and outcome of internationalisation were made, they have mostly remained limited to individuals' prior international experiences only and have not studied broader set (i.e. both general and specific human capital) of human capital factors, mostly international experience or exposure (De Cock, Andries and Clarysse, 2021; Pidduck et al., 2020; Prashantham et al., 2019; Autio, 2017). A Gruenhagen et al. (2018) study, based on longitudinal data from the Comprehensive Australian Study of Entrepreneurial Emergence (CAUSEE), found that breadth of international experience positively impact a firm's internationalisation.

Theoretical framework

Human capital factors affect the spatial proximity of networks and individuals with higher human capital tend to have a wider scope of action that extends further nationally and internationally, benefitting from (inter)national contacts that they established during their education or other waged experiences (Schutjens and Stam, 2003). It has therefore been found that spatial proximity related coordination (e.g. relational trust) and logistical (e.g. lower transaction costs) benefits contribute towards enhanced profitability (Autio *et al.*, 2018).

International business scholars have argued that expanding internationally is more time-consuming than domestic expansion and that the born global firms that quickly establish internationally (foreign sales) are an exception (Hennart, Majocchi and Hagen, 2021). New ventures aiming to internationalise more quickly would require increased levels of resources and commitment (Puig, Gonzalez-Loureiro and Ghauri, 2018) to enable them to manage a larger scope of activities in different markets (Choquette *et al.*, 2017). Moreover, research has shown that speed to internationalisation, though a strategic choice, has performance

consequences (Sadeghi, Rose and Chetty, 2018). Moreover, the early internationalisation trend is not just limited to the born global start-ups (Singh, 2017) and has been increasingly the choice of many new ventures (Puig, Gonzalez-Loureiro and Ghauri, 2018).

Human capital theory suggests that individuals with greater human capital are more likely to create new ventures with better performance (Davidsson and Honig, 2003) and this has been validated both in the local and international context/markets (Ahmed and Brennan, 2019). Therefore, the human capital theory has provided a better understanding of the role of human capital factors in entrepreneurial entry, survival, and exit (Guerrero and Espinoza-Benavides, 2021; Parker and Van Praag, 2012). The human capital and internationalisation association has also found that human capital factors not only increase chances of internationalisation (Manolova et al., 2002) but also enhance export propensity and intensity (Stucki, 2016) pointing toward the benefits of knowledge gained and learning to the speed of internationalisation (Prashantham and Young, 2011). I posit that the human capital theory should be applied to a wider context (different spatial scope) and not just internationalisation and/or speed of internationalisation, particularly for nascent entrepreneurship to better explain the marginal rate of return (i.e. a shorter duration to a profitable outcome in my study) on human capital investments (e.g. return on an additional level of education) and to understand better about differences in the entrepreneurial process outcome (Moog, 2002). A study, conducted on the firm resources level, has found that SMEs exporting to a wider spatial scope tend to achieve better performance and growth as exporters (Ismail, 2017). But again that leaves the opportunity to directly check the impact of human capital factors on a wider spatial scope and not to limit research focus on either firm (MNEs) level or international scope only. This study will therefore contribute to nascent entrepreneurship and entrepreneurial process duration, by adopting a nested model to expand beyond the typical local-international dichotomy, to access the real (direct) contribution of founder's human capital on a profitable venture creation within a shorter duration of time.

Human capital has been found as a key driver of the relationship between export complexity and venture growth (Nouira and Saafi, 2021). Two types of human capital have been identified that influence venture market scope (Domurath and Patzelt, 2019): general human capital which includes educational attainment and work experience and which is also transferable to multiple contexts; and specific human capital which includes skills and experiences that have lower transferability being context-specific e.g. industry experience and start-up experience (Domurath and Patzelt, 2019; Rauch and Rijsdijk, 2013; Gary S. Becker, 1964).

Hypotheses

Activity across international borders, also termed Cross-border entrepreneurship, provides entrepreneurs with an opportunity to access new markets and may also benefit from extended sources of their supply, capital, labour, and technology (Smallbone and Welter, 2012). International entrepreneurship involves pursuing entrepreneurial opportunities across national borders (Mainela, Puhakka and Sipola, 2018; Reuber, Dimitratos and Kuivalainen, 2017). Investigating the relationship between spatial scope (e.g. internationalisation) and performance can facilitate new theoretical developments (Kiss, Danis and Cavusgil, 2012). One interesting insight is that intraregional geographic diversification may carry lower failure risk as compared to interregional geographic diversification which increases the risk of failure (Patel, Criaco and Naldi, 2018).

International opportunities are often exploited in highly uncertain environments, compared to the local environment, and therefore are difficult to predict and control (Nowiński and Rialp, 2016). Founder's characteristics are believed to help them with knowledge acquisition and interpretation that can facilitate their internationalisation efforts (Bowen, 2020). Founder-level factors have also been found to accelerate internationalisation (Romanello and Chiarvesio, 2017) and human capital has been considered one of the major intangible resources for internationalisation (Javalgi and Todd, 2011). It has also been proposed that for future nascent entrepreneurship theorising in terms of factors that influence different responses, future studies should consider location (i.e. target market) specific consideration as they may pose certain challenges that may impact entrepreneurial action (Davidsson and Gordon, 2016). The speed of internationalisation is an important time-based dimension (Prashantham and Young, 2011). Some firms take less time from the inception to internationalise because of their capacity to integrate new knowledge and their ability to synchronise their activities with the activities of a new geographical market (Johanson and Johanson, 2021).

Geographical proximity to customers could limit entrepreneurs' attempts to tap into non-local customers (Kang, Jiang and Tan, 2017), and proximity does not necessarily facilitate local collaboration either (Ben Letaifa and Rabeau, 2013), as geographical proximity with customers and partners sometimes creates a lock-in effect that isolates these ventures from utilising beneficial external sources and opportunities (Presutti et al., 2019). Moreover, customer relationships and the importance of physical proximity continue to be affected by the changing globalisation, regulations, policy (Leick et al., 2020), and technology landscape (Karlsson, Rickardsson and Wincent, 2021). This suggests that factors other than geographical proximity may also contribute to being fast and successful at different locations. It has been therefore argued that to better understand a venture's internationalisation behaviour, research must also have a founder and/or team-level focus, which drives the firm (Coviello, 2015).

Internationalisation behaviour is also believed to be influenced by the founder's human capital (Jones and Coviello, 2005), however, existing research has largely ignored two key aspects: First, studying the effect of human capital from a wider geographical distance/location perspective (beyond national-international), and second, studying venture outcome (Huggins, Prokop and Thompson, 2017), especially speed to profitability. This is important because the majority of entrepreneurs start businesses close to the locality of their key customers, which helps them in avoiding extended work hours, save on commuting costs, facilitate greater access to finance and enable them to benefit from their local networks (Parker, 2018a). Moreover, from a theoretical perspective, studying speed to venture profitability is key to understanding the dynamics of spatial e.g. internationalisation, as fast-paced geographical expansion can be a competitive advantage for new ventures that normally have limited resources (Sadeghi, Rose and Chetty, 2018) that are normally resource-constrained and which can impact duration to internationalisation as ventures try to focus more on their home markets before internationalising (Wadeson, 2020). Studies have mostly attempted to understand the relationship between human capital and speed but not necessarily included the outcome (e.g. profitable launch) of the entrepreneurial process (Guerrero and Espinoza-Benavides, 2021; Paul and Rosado-Serrano, 2019). Alomani, Baptista and Athreye (2022) have argued that individuals with higher human capital tend to be better at decision-making related to exploiting different opportunities and mapping alternative market entries. It can therefore be expected that venture creation efforts by founders with higher human capital would be able to perform better (i.e. in terms of shorter duration to a profitable new venture creation).

Theoretical research in this field has argued for the importance to study human capital to understand which factors can help to determine outcomes from the entrepreneurial process (Simon C. Parker, 2011), and hence speed to the profitable outcome is the focus of this study. Human capital help individuals in discovering and creating entrepreneurial opportunity (Matthew R. Marvel, 2013), and aid them in exploiting opportunities to create new ventures (Dimov, 2010). Therefore, human capital factors, both general i.e. education (Jafari-Sadeghi, Nkongolo-Bakenda, *et al.*, 2020) and specific i.e. prior start-up experience (Kato, 2020; Ahmed and Brennan, 2019) have continued to remain entrepreneurial research focus.

In terms of general work experience (general human capital factor), it is believed it would apply to different settings not being linked to a specific context; it refers to people's overall experience that is not tied to a specific context (Yavuz, 2021). Full-time paid work experience (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015) has been found to increase an individual's likelihood of being a nascent entrepreneur, benefitting from better networks, and interacting

with wider teams, suppliers, and customers (Mueller, 2006), however, research on previous work experience and its impact on earlier internationalisation has remained inconclusive (Federico *et al.*, 2009) as founders' general prior work experience (i.e. not in the same industry) is not linked to venture growth (Hashai and Zahra, 2022). Moreover, it has been suggested that in terms of geographic scope (i.e. new export markets) previous work experience may not be valuable, and risky, because decision-making based on previous procedures and standards or inferences about past experiences both successes and failures may not fit the new project (Evangelista and Mac, 2016). Generic work experience has also been found to not facilitate foreign growth (D'Angelo and Presutti, 2019), and even if it does affect, it affects different spatial scopes differently (Varma, Nayyar and Bansal, 2016). Varma, Nayyar and Bansal (2016) also found that prior work experience in regional and national networks (i.e. home country networks) may not directly facilitate internationalisation.

Similarly, although the nascent entrepreneurs gain valuable knowledge, skills, and network through their prior industry experience (Dimov, 2010), which has been argued to provide start-ups with better customer identification and handling, enhancing growth (Hashai and Zahra, 2022) but their prior industry experience has only been found advantageous in less dynamic external environments (Shepherd and Patzelt, 2021b), suggesting not to be of vital importance when it comes to more dynamic, wider spatial scope of sales. Moreover, prior industry experience has not been found helpful in entrepreneurial decision-making when it comes to uncertain environments and hence suggesting it not to be as important as the prior industry experience which is found to be an important factor in uncertain environments (Uygur and Kim, 2016), like a wider spatial scope of sales. I would therefore not expect prior work experience or prior industry experience to have a significant impact on the prospects of a profitable new venture creation at a wider spatial scope of sales and will not be testing for these human capital factors in my study.

Education

A founder's higher educational attainment has been found to greatly influence a venture's export performance (Mubarik, Devadason and Govindaraju, 2020) due to factors like being better at receiving external funding, and at judging a venture's innovativeness and growth potential (Ko and McKelvie, 2018), which can help both with the speed and profitable outcome at the different spatial scope. Educational attainment, a general human capital factor, is also not specific to a particular context and therefore can benefit ventures in different locations (Yavuz, 2021). Research has found, therefore, that nascent entrepreneurs' educational attainment not only assists them in selling to local customers (Simon C. Parker, 2011) but also

makes them more outward-oriented and more willing to engage internationally (Amorós, Basco and Romaní, 2016; Felício, Caldeirinha and Rodrigues, 2012; Evald, Klyver and Christensen, 2011; Federico *et al.*, 2009), by providing better perceptions of the viability of different international strategies (Zahra, Korri and Yu, 2005). Researchers have long discussed the national-international dichotomy and how years of education help entrepreneurs gain personal and professional networks (Goxe, Mayrhofer and Kuivalainen, 2022), however, I add to the literature because these factors also relate to larger scope within the country e.g. regional and national scope. It has been argued that postgraduate studies often enhance contact with different cultures and/or offer them an opportunity to travel internationally, which can enhance their knowledge of foreign markets and develop international networks (Federico *et al.*, 2009) but I argue that these aspects should also apply to nationwide contacts as well. Moreover, individuals with higher educational attainment are more likely to succeed in their internationalisation (exports) efforts (Ganotakis and Love, 2012) as they learn more about different markets and cultures, which helps them in discovering foreign market opportunities (Thai and Chong, 2008). Again the same factors can be extended to the nationwide scope as regional differences (based on consensus regions as they were studied as part of the PSED) are present and wide; doing business in West South Central (e.g. Oklahoma) is different than in the Middle Atlantic (e.g. New York) (U.S. Bureau of Labor Statistics, 2022). Knowledge of foreign markets, even before their first international venture has been found to have a positive impact on venture performance (Paul and Rosado-Serrano, 2019) and I have now attempted to extend the argument to interregional markets within country as they differ a lot in their export volume per population. The data that I analysed from the United States Census Bureau (2022) also highlighted wider difference in export volume (USD) per population e.g. for Middle Atlantic was 0.0027 and for West South Central it was 0.0054.

Education has been linked to the rapid internationalisation of SMEs (Onkelinx, Manolova and Edelman, 2012). Educational attainment has also been found as a significant predictor of venture internationalisation (Javalgi and Todd, 2011) and an entrepreneur's export behaviour (Federico *et al.*, 2009; Andersson and Evangelista, 2006; Evangelista, 2005) as it increases the intensity of international sales, benefiting from founders enhanced problem-solving skills that are crucial in the context of internationalisation (Ganotakis and Love, 2012), and all these factors also accelerate internationalisation (Onkelinx, Manolova, & Edelman, 2012). Founder's educational attainment has been found to make them more 'outward looking' and therefore has been associated with a higher likelihood of engaging in export activities (Evald, Klyver and Christensen, 2011). An entrepreneur's level of education also helps shape a global mindset (Felício, Caldeirinha and Rodrigues, 2012). Educational attainment has been found to

influence a venture's export performance (Mubarik, Devadason and Govindaraju, 2020) and nascent entrepreneurs with higher educational attainment are also found to be significantly more likely to export (Muñoz-Bullón, Sánchez-Bueno and Vos-Saz, 2015). Such advantage should then also apply within the country's scope, as founders are confident that their educational attainment will enable them to manage international activities and succeed (De Clercq and Bosma, 2008). Formal education provides entrepreneurs with envisioning and foresight competencies that can help them in their pursuit of opportunities both in domestic and international environments (Jafari-Sadeghi, Kimiagari and Biancone, 2020). Higher educational attainment has also been found to be transferable and useful in multiple contexts (Domurath and Patzelt, 2019), and therefore assuming that educational attainment only benefits in the international scope would not be a good idea. Founders' educational attainment has also been found to aid all kinds of start-ups (e.g. not just technology start-ups), in their export activities, as these founders have better decision-making skills that provide them with a competitive advantage (Stucki, 2016) in wider spatial scope, and that makes me believe that it should positively impact the duration to a profitable outcome as well.

Yavuz (2021) has argued that although founders with higher educational attainment benefit from their formal ties due to the informational advantages but they miss out on benefitting (useful market insights) from their informal but valuable ties because they think such ties distract them from their international efforts. The same I believe would be valid for within-country scope, and speed. Ahmed and Brennan (2019) have also found no direct or indirect impact of the founder's educational attainment on the extent and duration of expanding the spatial scope (i.e. internationalisation), and if it is the context that makes the difference then the same should hold in the case of other spatial scopes (i.e. regional and national). Santhosh (2021) found that the founder's educational background is not statistically significant in exporting, and even when there was a link, education was only weakly positively statistically related to exporting (Felzensztein *et al.*, 2015). Mickiewicz *et al.* (2017) also suggested that nascent entrepreneurs' higher education demotivates them from pursuing entrepreneurship due to the higher opportunity cost, and that brings in support for lower educational levels to be good enough for entrepreneurial outcomes too. For instance, high school graduates in acquire both cognitive and non-cognitive skills through different assessment criteria, which provide a good basis for an entrepreneurial career (Rodriguez and Lieber, 2020). These students also acquire entrepreneurial skills through in-class exercises like practical work and group discussion, which equip them with problem-solving skills that are key to an entrepreneurial journey (Arshed, Rauf and Bukhari, 2021). Schooling is also found to be positively related to entrepreneurship performance and therefore it has been argued that investment in human capital after schooling should be treated as lifelong learning at different

educational levels (Van Der Sluis, Praag and Vijverberg, 2008). Again suggests that high school experience is perhaps good enough for a positive entrepreneurial outcome. Moreover, the community colleges (post-high school) work closely with the community to develop a curriculum to cater to local demand (Barnard, Pittz and Vanevenhoven, 2019), which exposes these students to entrepreneurial opportunities available locally but is it good enough for a wider spatial scope, this needs investigation which will be checked through my nested model. A post-high school qualification has also been found to be linked to a higher start-up rate and has a positive effect on entrepreneurial process outcomes (Huang, Tani and Zhu, 2021).

However, given the wider support to higher educational attainment and spatial scope/export orientation (Muñoz-Bullón, Sánchez-Bueno and Vos-Saz, 2015), and that higher educational attainment provides better adaptability and flexibility to an individual (Ribeiro-Soriano and Urbano, 2010); enhance an individual's ability to identifying and pursuing entrepreneurial opportunities beyond national borders (Lafuente, Stoian and Rialp, 2015) because of them being better at an assessment of the likelihood of success by pursuing those opportunities (Robinson and Sexton, 1994); having better foresight competencies to help in effective business creation (Jafari-Sadeghi, Kimiagari and Biancone, 2020); and that formal education provide these founders with better adaptability that is crucial in a new and dynamic market scope (Chowdhury, Terjesen and Audretsch, 2015), highly educated founders should enjoy both the duration advantages as well as the likelihood of a positive outcome, I therefore postulate:

H1a: The likelihood that a nascent entrepreneur will create a profitable venture with international scope in a shorter duration of time is higher when a nascent entrepreneur has higher educational attainment

H1b: The likelihood that a nascent entrepreneur will create a profitable venture with national and international scope in a shorter duration of time is higher when a nascent entrepreneur has higher educational attainment

H1c: The likelihood that a nascent entrepreneur will create a profitable venture with a regional or wider scope in a shorter duration of time is higher when a nascent entrepreneur has higher educational attainment

Entrepreneurial Experience

Founder's prior entrepreneurial experience has been identified as a catalyst toward opportunity identification and exploitation, and successful venture creation (Ahmed and Brennan, 2019) as the prior start-up experience not only provide founders with in-depth market

knowledge but also helps them to develop key business networks, both locally and internationally (Federico *et al.*, 2009). Such knowledge and capabilities, therefore, contribute to the successful and speedier exploitation of foreign markets (Morrish and Vasilchenko, 2013). Prior entrepreneurial experience is an important determinant of new investment decisions (Nguyen, 2019) as entrepreneurs become more confident, develop better cognitive skills, and gain valuable knowledge regarding pricing, value propositions, and products on a wider geographical scale and beyond borders (Debrulle and Maes, 2015). Prior entrepreneurial experience has also been found to be very effective in achieving foreign growth (D'Angelo and Presutti, 2019) and individuals with prior entrepreneurial experience are more likely to export (Muñoz-Bullón, Sánchez-Bueno and Vos-Saz, 2015).

The founder's prior start-up experience helps in accumulating knowledge and learning that facilitates new ventures' early internationalisation (Ahmed and Brennan, 2019; Naudé and Rossouw, 2010). Prior entrepreneurial exposure has also been linked to enhancing entrepreneurial self-efficacy for international activities (Pidduck *et al.*, 2020), building founder's knowledge by doing and enhancing abilities to discover and exploit opportunities (Bradley *et al.*, 2012), and helping them to develop in-depth market knowledge and networks both locally and internationally (Federico *et al.*, 2009). González-López, Pérez-López and Rodríguez-Ariza (2021) found that prior entrepreneurial experience boosts an individual's entrepreneurial competencies (e.g. planning and implementation skills). Mainela, Puhakka and Sipola (2018) also found that prior entrepreneurial experience help founders in navigating through both local and global markets. Prior entrepreneurial experiences, particularly those that were not successful (negative), teach founders a valuable lesson of being aware of the time-compression diseconomies and shaping their internationalisation strategy accordingly (Mohr and Batsakis, 2019). Jafari-Sadeghi, Kimiagari and Biancone (2020) have also found that even previous domestic entrepreneurial experience positively affects venture internationalisation. It is important to note here that the majority of studies have studied the impact of individuals' prior international experiences on speed and outcome (De Cock, Andries and Clarysse, 2021; Pidduck et al., 2020; Prashantham et al., 2019; Autio, 2017), which is not something all nascent entrepreneur would have, therefore, I have focused on prior start-up experience to establish how this specific human capital impacts a successful venture creation with a shorter period of time.

On the contrary, Evald, Klyver and Christensen (2011) have also argued that the founder's prior entrepreneurial experiences might make them domestically oriented and therefore may not help them to initiate internationalisation or enhance export intentions. Similarly, Muñoz-

bullon, Sanchez-bueno and Vos-saz (2015) have argued that experience from one entrepreneurial process may not be transferable to another venture creation process because all ventures are somewhat different. This would mean that with different spatial scopes, the founder's start-up experience may not be useful. Moreover, the pace of geographical expansion varies with market context (Blesa and Ripollés, 2021) and therefore, prior local start-up experience has been found to slow down internationalisation (Domurath and Patzelt, 2019), as the founder's absorptive and adaptive capabilities that are considered critical for cross-border expansion may not be appropriately developed through limited start-up exposure (Blesa and Ripollés, 2021; Ismail and Kuivalainen, 2015).

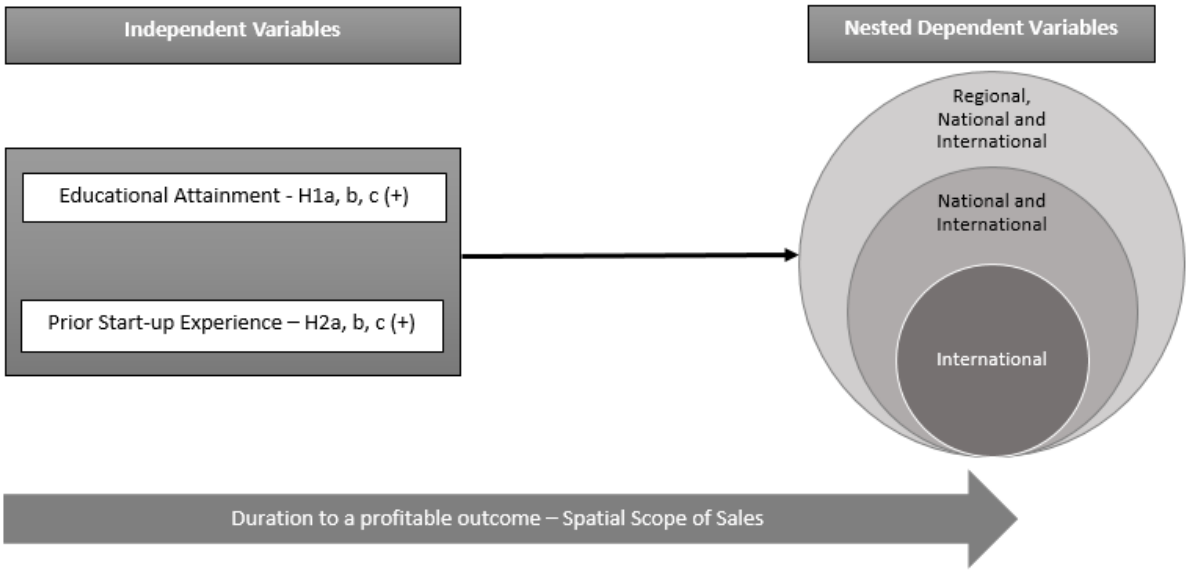
However, given that prior entrepreneurial experience boosts individual entrepreneurial competencies (González-López, Pérez-López and Rodríguez-Ariza, 2021) that help them to efficiently steer through both local and global markets (Mainela, Puhakka and Sipola, 2018); and founders with prior start-up experience are capable of faster decision making (Forbes, 2005), I would posit that prior entrepreneurial experience would be helpful at multiple spatial scopes of sales (e.g. export, internationalisation, etc.) and would accelerate the venture creation.

H2a: The likelihood that a nascent entrepreneur will create a profitable venture with international scope in a shorter duration of time is higher when a nascent entrepreneur has prior entrepreneurial experience

H2b: The likelihood that a nascent entrepreneur will create a profitable venture with national and international scope in a shorter duration of time is higher when a nascent entrepreneur has prior entrepreneurial experience

H2c: The likelihood that a nascent entrepreneur will create a profitable venture with a regional or wider scope in a shorter duration of time is higher when a nascent entrepreneur has prior entrepreneurial experience

Figure 4.1 Conceptual Framework



4.3 The Methods Section

4.3.1 Research design and sample

Data (Harmonised PSED – US cohorts)

The Panel Study of Entrepreneurial Dynamics (PSED) has been implemented in eight countries (Australia, Canada, China, Germany, Netherlands, Norway, Sweden, and United States) and the US cohorts (PSED I & II) are the most extensive datasets among all national projects. US PSED I screening was initiated in 1998 and was completed in 2000. US PSED II screening was initiated in 2005 and was completed in 2006 followed by six yearly interviews (Reynolds *et al.*, 2018): US PSED II data were collected between 2005 and 2011 on entrepreneurs who were in the process of starting a business in 2005 and 2006 (Zettel and Garrett, 2021).

The Panel Study of Entrepreneurial Dynamics (PSED) offers great potential to expand nascent entrepreneurship research based on information about start-up activities, founder's and start-up characteristics, and geographical proximity that facilitates a formal new venture creation (Credit, Mack and Mayer, 2018). Some of its initial cohorts (e.g. PSED I) are therefore still being used to empirically test nascent venture creation (Alomani, Baptista and Athreye, 2022; Chen *et al.*, 2018). Over 200 peer-reviewed journal articles have been published using the

PSED cohorts (Frid, 2019), including a recent one from Kwapisz (2021) and Zettel and Garrett (2021) based on the PSED II dataset. This chapter, by combining PSED I and PSED II data, benefits from an increased sample size of nascent entrepreneurs/ventures, which helps in capturing better effects of various factors and processes (Reynolds *et al.*, 2018).

The PSED's design has been argued to have two key advantages over other studies on new venture creation processes. First, it overcomes the recall biases and survivorship biases associated with surveying entrepreneurs already in business. Second, it tracks nascent entrepreneurs over an extended period (six years), which provides an excellent opportunity to study them throughout the entrepreneurial process including gestation activities and venture outcomes (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015). It has been therefore suggested that PSED provides researchers with an opportunity to better understand the nascent venture creation process, the founder being the unit of analysis, and to produce meaningful interpretations of the entrepreneurial process outcomes (Alomani, Baptista and Athreye, 2022; Davidsson and Gordon, 2012; Reynolds and Curtin, 2008), and researchers continue to use and benefit from the PSED datasets (Ko, Wiklund and Pollack, 2021; Kwapisz, 2021; Zettel and Garrett, 2021).

4.3.2 Nested Models

Entrepreneurship scholars have used the nested model in entrepreneurship research (Dileo and García Pereiro, 2019; Bruns *et al.*, 2017; Estrin and Mickiewicz, 2011). Following Estrin, Mickiewicz and Rebmann (2017), I utilise three nested dependent variables differentiated by different levels of the spatial scope of sales. The nested model for my dependent variables enables unbiased estimation of the determinants of each category (spatial scales) of the same entrepreneurial outcome separately, without concern for cross-equation correlation (Estrin, Mickiewicz and Rebmann, 2017; Dean and Dunsmuir, 2016; Estrin and Mickiewicz, 2011; Wooldridge, 2010). By developing a nested model that includes the founder's human capital factors that may influence the entrepreneurial process outcome (i.e. profitable launch in shorter duration), I test a hypothesis concerning the spatial scope of sales (i.e. regional, national and international; national and above, and international spatial scope), which is also in line with suggestions by Beliaeva *et al.* (2020) to study spatial scope (i.e. local, regional and national effects) of the entrepreneurial process outcome.

In my nested model, the concepts of 'local', 'regional' and 'national' are defined as arbitrary intervals imposed on the continuous scale of the spatial radius of sales. It implies that they are

not distinctively separate categories, and should be interpreted as nested measures of the scope of sales. The difference is the 'international' category, which is defined not over spatial scope but the borders. While the latter category is my main focus of interest, the nested design helps to illustrate that the spatial scope can be analysed within a uniform framework. The underlying context of the spatial scope of sales effect is presented in Figure 4.1 (conceptual framework), wherein the internationalisation scope is embedded within the national and above scope, and the national and above scope is embedded within the widest scope (i.e. regional, national and international). The wider spatial scope of sales encapsulates lower-level spatial scopes. This is done because the role of varied levels of spatial scope in explaining internationalisation has been considered in the international business literature, and researchers have attempted to provide clarity on internationalisation and region of origin (Elango and Wieland, 2017).

Cox Model

Cox regression, a semi-parametric model (Felipe *et al.*, 2022) is a robust technique for hazard-rate analysis (Basco *et al.*, 2020). It analyses the amount of time until an event (Warhuus, Frid and Gartner, 2021) and has been used to establish the likelihood of ventures' internationalisation and survival (Deng *et al.*, 2022; Felipe *et al.*, 2022; Feng, Allen and Seibert, 2021; Lee, 2021; Zettel and Garrett, 2021; Puig, Gonzalez-Loureiro and Ghauri, 2018). Recently, the Cox model has been applied to PSED II dataset by Zettel and Garrett (2021) to analyse entrepreneurs' exit hazards. Puig, Gonzalez-Loureiro and Ghauri (2018) have also used the Cox model and found that early internationalisation poses a higher mortality risk compared to domestic ventures.

Kaplan-Meier survival curve

I have also used the Kaplan-Meier survival method to construct Kaplan-Meier curves, to show the time intervals that are not established in advance but are dictated by the occurrence of the hazard (i.e. a profitable venture creation) (D'Arrigo *et al.*, 2021). The Cox regression methods and the Kaplan-Meier are widely used statistical techniques for performing "time to event analysis" (ElHafeez *et al.*, 2012).

Competing Risks

A subject when exposed to mutually exclusive events (for example, failure or success), whereby the incidence of one event hinders the occurrence of another, is termed as competing risk, and to avoid misleading inferences, competing risks should be accounted for (Haushona *et al.*, 2020). The competing risk model is an extension of the basic Cox (1972) survival model and has been widely used in entrepreneurship duration research (Grashuis, 2021; Caroni and

Pierri, 2020; Millán, Congregado and Román, 2012). Competing risk sub-models have also been used, in combination with the Cox models, to check the goodness of fit of the longitudinal data (Mehdizadeh *et al.*, 2021). My reason to use the competing risk model (proportional sub-distribution hazards model) is also to perform a competing risk analysis as a sensitivity analysis and check the robustness (Li *et al.*, 2015) of the Cox model findings. I also wanted to ensure that the Cox model's limitation in terms of overestimating the risk (Berry *et al.*, 2010) of a profitable venture outcome in a shorter period of time has been accounted for.

4.4 Variables and measures

4.4.1 Dependent Variable

Entrepreneurial research has used a start-up with a positive cash flow as a criterion for identifying an operational nascent venture (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015). Consistent with this, in this chapter, the profitable outcome and its duration have been tested through a nested model. The spatial scope of sales has been set on three levels: regional, national and international, national and above, and international. In the PSED surveys, nascent entrepreneurs were asked questions about the location (in miles) of customers (in percentage); local customers being within 20 miles of the new business, regional being between 20-100miles, national over 100 miles away, and finally the international customers that reside outside the United States of America. The dependent variable, in the harmonisation of PSED I and II, is the venture creation when there is an initial presence of monthly profits (Reynolds *et al.*, 2018). If the date of the initial presence of monthly profit was missing, Reynolds *et al.* (2018) considered the initial presence of profit in six to twelve months. I used this baseline variable to define three nested dependent variables: speed to the creation of profitable business with regional, national and international, national and above, and international scope of sales, correspondingly.

4.4.2 Independent Variables

The human capital variables (i.e. educational attainment and start-up experience) were discussed in detail in Chapter 2. Based on the operationalisation mentioned by Raynolds (2018) and Reynolds *et al.* (2018), educational attainment has been categorised into four levels: up to high school degree; post-high school pre-college; college degree; and graduate experience. The start-up experience is defined as having none or having start-up experience.

4.4.3 Competing outcome variable

Disengagement (founder's exit) has been operationalised as individuals (respondents) who have chosen not to continue with the entrepreneurial process and have discontinued start-up

efforts (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015). The competing risk of the founder's disengagement has been therefore modelled for all three spatial scopes in the nested models. The disengagement criteria for PSED I was a start-up opportunity no longer worked by any founding/team member. For PSED II multiple criteria were used ranging from: it was less than 160 hours devoted to venture in the past 12 months, expect less than 80 hours of work on the venture in the next 6 months, no longer a major focus of the work career (Reynolds *et al.*, 2018).

4.4.4 Control variables

I used various controls to test the sensitivity of the results, some also used by Parker (2011), for: (1) the inclusion of social capital that may have importance in the case of nascent entrepreneurship (2) the use of different measures of general human capital and specific human capital; (3) controls for growth orientation of nascent entrepreneurs being more relevant in the case of nascent entrepreneurship; and (4) the inclusion of controls for sector type. Using longitudinal data has also helped in overcoming the possibility of potential endogeneity (Dheer, 2018).

The human capital variables (i.e. work experience and industry experience) were discussed in detail in Chapter 2. Based on the operationalisation mentioned by Raynolds (2018) and Reynolds *et al.* (2018), the work experience (F/T, P/T, self-employed) is operationalised as none or yes. The industry experience (same sector work experience) is defined as none or having industry experience.

Team Size: Start-ups led by teams are more likely to reach profitability and less likely to disengage (Reynolds, 2018). Team size has also been found to positively influence the likelihood of early internationalising firms because of team members' complementary effect of diversity of knowledge, skills, and experiences (Federico *et al.*, 2009). Export entry has also been found to be positively impacted by the presence of an entrepreneurial team (Lafuente, Stoian and Rialp, 2015). Start-up teams also better manage task allocation among themselves (e.g. finding investors and launching products/services), allowing them to quickly internationalise (Stayton and Mangematin, 2016). Venture teams also contribute to better search and integration of new with existing knowledge (absorptive capacity) on the foreign market and provide start-ups with both strategy and time (i.e. faster) advantage, vital for dealing with multiple export markets (Evangelista and Mac, 2016). I have, therefore, set control for the team size, as my study focus is on founder-level human capital.

Location (Census Divisions): Locational boundaries (i.e. border effects/cross-border effects) have been found to affect the extent of internationalisation (Elango and Wieland, 2017). I have therefore controlled the nine census divisions.

Hi-Tech: High-tech ventures, which operate under a more dynamic and risky business environment, require higher levels of entrepreneurial absorptive capacity and scientific knowledge to discover knowledge-based opportunities and therefore human capital factors can become more important (Qian, Acs and Stough, 2013). Industry type (i.e. hi-tech/non-hi-tech) has also been found to have an impact on a venture's export performance (Rialp and Rialp, 2007). Hi-tech firms were found to internationalise quicker than non-hi-tech start-ups, however, the difference is not statistically significant (Singh, 2017), which is also in line with the findings of Choquette *et al.* (2017) whereby born global occurrence is not related to specific sectors. I have therefore used industry type (hi-tech/non-hi-tech) as a control to account for the mixed findings.

Internet Access: Venture's internationalisation speed is influenced by domestic and foreign market conditions, such as technology (Bowen, 2020), and internet-based technologies are considered to facilitate internationalisation by providing a comparative advantage in highly dispersed operations that may involve supply chain efficiencies required in international operations (Etemad, 2017). The Internet has long enabled ventures to establish contact with their stakeholders (e.g. customers, suppliers, and distributors) regardless of geographic proximity (Audretsch, Heger and Veith, 2015; Mostafa, Wheeler and Jones, 2006). Internet access also substitutes relational trust, being considered an in-built trust mechanism, and therefore reduces new ventures' dependence on spatial proximity (Autio *et al.*, 2018). For these reasons, I am controlling internet access.

Preference for Firm's Growth: Internationalisation motives, which I generalised to other measures of spatial scope, are likely to be triggered by growth motives such as higher profit-making and market expansion (Jafari-Sadeghi, Dutta, *et al.*, 2020). Nascent entrepreneurs' growth aspirations have been found to have a significant relationship with time being spent on the entrepreneurial process (Reynolds, 2018) and therefore other researchers have also accounted for the growth expectations in their studies (Fernandez, 2021). However, growth ambitions were also not found to be significant in determining internationalisation speed (Santhosh and Bala Subrahmanya, 2020). I have therefore used the founder's growth preference as a control as it may impact the timing and choice of opting for a specific spatial scope of sales.

Gender: Gender has been vastly used as a control variable in entrepreneurial research (Fernandez, 2021; Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015) as a control for demographic influences (Stam, Audretsch and Meijaard, 2009). Women were found to have a lower likelihood of becoming nascent entrepreneurs than men (Reynolds *et al.*, 2004) and tend to have a disadvantage over men in later stages (i.e. near or after the launch) of the venture creation process (Parker, 2018a). Female-led ventures are also found to be less likely to choose the internationalisation route and they may not enjoy the same access as men to the traditional networks that are important for internationalisation (Pergelova, Angulo-Ruiz and Yordanova, 2018). I am therefore controlling for gender as a decision around spatial scope may come earlier (born global) or later (internationalisation) during the process.

Funding: Entrepreneurs' access to funding is also considered to influence entrepreneurial engagement and activities (Fernandez, 2021; Chen *et al.*, 2018). Seeking external funding has also been found to help identify those nascent ventures that may not become profitable (Reynolds, 2018).

Business Idea: The founder's initial international business idea benefits from customer and market feedback, which can lead to efficient resource allocation (Bai *et al.*, 2021; Lynch and Corbett, 2021). Moreover, entrepreneurs with a business idea may be able to run a post-entry assessment of their idea, benefitting from market knowledge, and that can reduce any uncertainties (Hayton and Cholakova, 2012), and be quicker in the implementation of those ideas (Johnson, 1990). I have therefore added the initial business idea as a control, based on the PSED question on a business idea and if that was a reason to enter the entrepreneurial process.

Business Plan: Initiating a business plan has been categorised as the main gestation activity in PSED studies (Klyver, Honig and Steffens, 2018; Reynolds, 2016) as starting a profitable business involves planning around the idea of self-employment and how to transform that idea into a new business through resource assessment including access to diverse resources (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015). Changes to the original business plan are uncommon and only 4% of nascent entrepreneurs were found to adjust their business plans (Reynolds, 2018).

Business Registered: Registering of business has been identified as one of the key gestation activities within the PSED studies (Klyver, Honig and Steffens, 2018; Reynolds, 2016), which provides legitimacy to new start-ups, and through registration, these ventures can benefit from

efficient resource provision and mobilisation (Kistruck *et al.*, 2015). I have therefore used it as a control because a wider spatial scope of sales would be benefitting from the legitimacy element and minimise the liability of newness. PSED I question on business registration was, what is NOW the legal form of the new business? In PSED II the question was, what is the current legal form of this new business -- would you say it is a sole proprietorship, a general partnership, a limited partnership, a limited liability corporation or LLC, a sub-chapter S corporation with no more than twenty shareholders, a general corporation, or has the legal form not been determined yet?

Age: The role of the founder's age in the new venture's internationalisation has remained ambiguous (Amorós, Basco and Romaní, 2016). Ahmed and Brennan (2019) found the founder's age to have a positive impact on the early internationalisation of ventures, and because age is a proxy of the human capital accumulation process, is found to influence positively the duration of the international venture creation process (Federico *et al.*, 2009). Moreover, older entrepreneurs can make faster and more efficient decisions, aided by their past experiences (Forbes, 2005), which again can impact the duration and outcome of the entrepreneurial process under different spatial scopes. Similarly, with age comes more contacts, maturity, and problem-solving skills that can enhance the venture's prospects (Del Sarto *et al.* (2021). I, therefore, expect it to have an impact on the outcome of the venture creation process at different spatial scopes of sales as they may require a wider set of skills, both soft and hard skills.

Born in the country: Founder's experience in the local ecosystem impacts their internationalisation beliefs as they believe these stronger ties provide them to first test their business model and benefit from the access to crucial resources that they require for their venture internationalisation (De Cock, Andries and Clarysse, 2021). However, Raynolds (2018) has found virtually no difference in venture outcomes based on birth origin (i.e. born in or outside the United States). I have put it as a control variable to account for any impact of how being born in the country on the likelihood of venture success at different spatial scopes of sales. PSED I and PSED II question on this variable was, were you born in the United States?

Full-time basis: The duration of full-time and part-time ventures differs and as Viljamaa, Joensuu-Salo and Kangas (2021) have found that part-time entrepreneurship duration (in years) can also vary with the founder's age (higher in the third-age group), and sector (majority operating in the service sector).

4.5 The Analyses and Results Section

Table 4.1 and 4.2 shows descriptive statistic and correlations for all variables. The majority of correlations for Outcome Profit at three nested models (i.e. study focus) are low to moderate, but some correlations exceed 0.50, notably among the variables at the different spatial scope, external funding received, internet/phone listing, business registration, and full-time commitment to the venture creation process. These correlations increase the probability that Type I errors (i.e., not finding a relationship when there is one) and significance levels will be underestimated.

Team size also tends to have a stronger correlation with business plan initiation, and external funding received, and so does the start-up experience with growth preference, business registration, and phone/internet listing. Both of the general human capital factors (education and work experience) have a stronger correlation with business registration. This shows that certain human capital factors and start-up activities are strongly correlated with respect to a profitable outcome with different spatial scopes of sales.

Table 4.1 Variable descriptive statistics

Variables	Definition / Criteria (Reynolds *et al.*, 2016)	Mean	Std. Dev.	min	max
OutcomeProfitR	Regional, national and international (i.e. regional+national+international) customers, Customers 20-100 miles away (regional), customers > 100 miles away (national), and international customers that are outside the US	.124	.33	0	1
OutcomeProfitN	National and above (i.e. national+international) customers. Customers > 100 miles away and international customers that are outside the US	.081	.272	0	1
OutcomeProfitI	International customers (outside the US)	.019	.135	0	1
OutcomeQuit	US PSED I: No longer worked on by anyone. US PSED II: Less than 160 hours devoted to venture in past 12 months, expect less than 80 hours of work on the venture in the next 6 months, no longer a major focus of the work career.	.193	.395	0	1
EduAttainment	Educational attainment (level) of team member 1 (respondent). Represented in regression by a set of indicator variables. 1 = up to high school degree; 2 = post-high school, pre-college degree; 3 = college degree; 4 = graduate degree	2.309	.982	1	4
StartupExp	Other start-up experience. Have helped to start other businesses as an owner or part-owner = 1.	.457	.498	0	1
WorkExperience	Work experience (years) of team member 1 (respondent)	.986	.118	0	1
IndustryExp	Same industry experience. Years of work experience in the industry where the new business will compete.	.766	.423	0	1
TeamSize	Total number of owners	1.828	1.248	1	5
CensusDivisions	Nine (9) US Census Divisions	5.176	2.528	0	9
HighTechOrNot	Consider business hi-tech? Based on three items reflecting the technological sophistication of the firm: • Were the technologies or procedures required for this product or service generally available more than a year ago? • Were the technologies or procedures required for this product or service generally available more than five years ago? • Will spending on research and development be a major priority for this (new) business?	.287	.452	0	1
BusinessIdea	Source of initial motivation (business idea) of team member 1 (respondent) = 1	.769	.421	0	1
BusinessPlanInitiated	Business plan initiated or not, Yes = 100	72.225	44.789	0	100
GrowthPreference	Grow to a size that is easy to manage size or maximise firm growth	.21	.407	0	1
DefinedMarkets	Defining markets initiated, Yes = 100	78.099	41.358	0	100
ExternalFundingReceived	Received funding from external sources, Yes = 100	16.775	37.364	0	100
InternetPhoneListing	Initial dedicated phone listing, line, Yes = 100	49.527	49.998	0	100
BusinessRegistered	Obtained business registration number, Yes = 100	40.717	49.131	0	100
Age	Age of Respondent (alternatively categorised into age groups).	41.691	12.069	18	74
BornInTheCountry	Born in the country, Yes = 1	.943	.232	0	1
Gender	Declared gender (Respondent)	1.418	.493	1	2
FullTimeBasis	Full time start-up work	36.386	48.111	0	100

Table 4.2 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) OutcomeProfitR	1.000										
(2) OutcomeProfitN	0.787	1.000									
(3) OutcomeProfitI	0.365	0.464	1.000								
(4) OutcomeQuit	-0.184	-0.145	-0.067	1.000							
(5) EduAttainment	0.055	0.073	0.032	-0.013	1.000						
(6) WorkExperience	0.028	0.014	-0.028	-0.014	0.073	1.000					
(7) StartupExp	0.041	0.048	0.043	-0.025	0.164	0.050	1.000				
(8) IndustryExp	0.022	0.030	0.007	-0.087	0.034	0.005	0.035	1.000			
(9) TeamSize	0.033	0.046	0.040	-0.010	0.073	-0.030	0.015	-0.050	1.000		
(10) CensusDivisions	0.000	0.020	0.016	0.004	0.020	0.037	0.014	0.030	0.035	1.000	
(11) HighTechOrNot	0.030	0.038	0.044	-0.043	0.013	0.000	0.011	0.019	0.043	0.026	1.000
(12) BusinessIdea	0.000	-0.002	-0.017	0.010	-0.011	0.017	-0.015	0.095	0.001	0.019	-0.024
(13) BusinessPlanInitiated	0.074	0.065	0.035	-0.015	0.089	0.021	0.072	0.046	0.099	-0.009	0.053
(14) GrowthPreference	-0.036	-0.013	0.014	-0.023	-0.016	-0.023	0.047	-0.033	0.122	0.001	0.139
(15) DefinedMarkets	0.094	0.085	0.038	-0.018	0.214	0.019	0.138	-0.003	0.051	0.026	0.054
(16) ExternalFundingRcd	0.100	0.097	-0.013	-0.068	0.051	0.020	0.033	0.015	0.117	0.002	-0.031
(17) InternetPhoneListing	0.179	0.155	0.069	-0.025	0.090	-0.001	0.076	0.078	0.043	0.038	0.022
(18) BusinessRegistered	0.238	0.193	0.099	-0.149	0.154	-0.004	0.114	0.038	0.108	0.013	0.043
(19) Age	0.017	0.021	-0.029	-0.010	0.208	0.142	0.253	0.023	-0.038	0.029	-0.038
(20) BornInTheCountry	-0.001	0.013	-0.003	0.002	-0.056	-0.030	-0.039	-0.015	-0.010	0.008	-0.035
(21) Gender	-0.031	-0.045	0.002	0.032	0.046	-0.020	-0.032	-0.098	-0.063	-0.009	-0.129
(22) FullTimeBasis	0.162	0.139	0.077	-0.105	0.002	-0.033	0.034	0.122	0.011	-0.006	0.048

Table 4.2 Correlation matrix (cont.)

Variables	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
(1) OutcomeProfitR											
(2) OutcomeProfitN											
(3) OutcomeProfitI											
(4) OutcomeQuit											
(5) EduAttainment											
(6) WorkExperience											
(7) StartupExp											
(8) IndustryExp											
(9) TeamSize											
(10) CensusDivisions											
(11) HighTechOrNot											
(12) BusinessIdea	1.000										
(13) BusinessPlanInitiated	-0.012	1.000									
(14) GrowthPreference	-0.066	0.100	1.000								
(15) DefinedMarkets	-0.122	0.233	0.054	1.000							
(16) ExternalFundingRcd	0.026	0.118	0.022	0.115	1.000						
(17) InternetPhoneListing	0.129	0.152	-0.008	0.084	0.211	1.000					
(18) BusinessRegistered	-0.031	0.163	0.040	0.187	0.222	0.314	1.000				
(19) Age	0.038	0.009	-0.096	0.060	0.014	0.091	0.083	1.000			
(20) BornInTheCountry	0.019	-0.024	-0.046	-0.042	0.030	-0.039	-0.036	0.072	1.000		
(21) Gender	-0.010	-0.016	-0.086	0.051	-0.048	-0.060	0.005	0.035	0.026	1.000	
(22) FullTimeBasis	-0.057	0.109	0.023	0.113	0.092	0.194	0.262	-0.003	-0.014	-0.043	1.000

4.5.1 Results

Kaplan-Meier Curves

The Kaplan-Meier curves are presented along (and based on) the Cox model for my hypotheses, and to show the comparison of both the Cox and competing risks model, I have presented results together.

The lengths of the horizontal lines along the X-axis (time in quarters) represent the survival duration for that interval, which is terminated when a profitable venture is formed (i.e. occurrence of the event of interest). The vertical distances between the horizontal lines illustrate the change in cumulative probability as the curve advances and the curve's steepness is determined by the survival durations (i.e. length of horizontal lines on the Y-axis, which are there to make the curve observable (Rich *et al.*, 2010).

The Cox (Table 4.3) and competing risk models (Table 4.4) are interpreted in terms of the level of risk (likelihood of the outcome), and thus values over the unit (i.e. over 1) would imply an increased risk of that event happing, therefore, shorter duration and likelihood to a profitable venture creation duration. Conversely, a value lower than a unit (i.e. 1) would imply a longer likelihood and duration to a profitable venture creation duration. The hazard ratio (HR) over 1 suggests an increased likelihood (risk) of creating a profitable venture in a shorter duration of time. A sub-hazard ratio (SHR) over 1 would mean that at any point in time, the probability of creating a profitable venture in a shorter duration of time, is increased by x%, if not already achieved.

Both Cox and competing risks models indicate slight differences in what extent different founders' human capital factors (mainly only work experience) influence the duration to a profitable outcome at the different spatial scopes of sales. However, given that the conventional hazard model (Cox) ignores the competing risks (i.e. the possibility of the founder's exit from the process), the results of the competing risks model are more appropriate (Noordzij *et al.*, 2013).

Table 4.3 Cox regression model - OutcomeProfit (R/N/I)

VARIABLES	(1) Regional, National and International HR	Cox	95% Conf. Interval		(2) National and International HR	Cox	95% Conf. Interval		HR	(3) International Cox	95% Conf. Interval	
Educational Attainment (Baseline: Up to HS degree)												
Post-HS, no BA degree	1.107	0.102**	1.017	1.205	1.004	0.004	0.897	1.124	1.471	0.386***	1.137	1.902
		(0.043)				(0.058)				(0.131)		
College degree	0.910	-0.094*	0.826	1.002	1.015	0.015	0.897	1.149	1.421	0.352**	1.076	1.878
		(0.049)				(0.063)				(0.142)		
Graduate experience, degree	1.170	0.157***	1.059	1.294	1.302	0.264***	1.147	1.477	1.592	0.465***	1.179	2.150
		(0.051)				(0.064)				(0.153)		
Startup Experience (Baseline: No StartupExp)												
Have Startup Experience	1.033	0.032	0.971	1.098	1.029	0.028	0.950	1.115	1.765	0.568***	1.478	2.107
		(0.031)				(0.041)				(0.090)		
Work Experience (Baseline: No work Experience)												
Have work Experience	1.811	0.594***	1.283	2.555	1.052	0.051	0.740	1.497	0.257	-1.358***	0.173	0.383
		(0.176)				(0.180)				(0.203)		
Industry Experience (Baseline: No IndustryExp)												
Have Industry Experience	1.006	0.006	0.935	1.082	0.982	-0.018	0.894	1.079	0.621	-0.477***	0.520	0.741
		(0.037)				(0.048)				(0.090)		
Team Size (Baseline: One owner)												
Two owners/team members	1.052	0.051	0.986	1.122	0.792	-0.232***	0.727	0.864	0.425	-0.855***	0.346	0.523
		(0.033)				(0.044)				(0.105)		
Three or more owners/team members	0.983	-0.017	0.895	1.081	1.090	0.086	0.978	1.216	0.921	-0.082	0.736	1.152
		(0.048)				(0.056)				(0.114)		
Census Divisions (Baseline: New England)												
Middle Atlantic	0.772	-0.259***	0.662	0.900	0.501	-0.692***	0.410	0.611	0.419	-0.870***	0.288	0.608
		(0.078)				(0.102)				(0.191)		
South Atlantic	0.932	-0.071	0.804	1.079	0.847	-0.166*	0.708	1.014	0.469	-0.756***	0.328	0.671
		(0.075)				(0.091)				(0.183)		
East South Central	0.696	-0.362***	0.580	0.836	0.850	-0.162	0.690	1.048	0.308	-1.179***	0.192	0.492
		(0.093)				(0.106)				(0.240)		
West South Central	0.819	-0.199***	0.707	0.949	0.724	-0.323***	0.606	0.865	0.168	-1.783***	0.108	0.262
		(0.075)				(0.091)				(0.226)		
East North Central	0.958	-0.043	0.819	1.120	0.683	-0.381***	0.559	0.835	0.264	-1.331***	0.169	0.413
		(0.080)				(0.102)				(0.228)		
West North Central	0.838	-0.177**	0.712	0.985	0.572	-0.558***	0.463	0.707	0.844	-0.169	0.585	1.219
		(0.083)				(0.108)				(0.187)		
Mountain	0.916	-0.087	0.785	1.069	0.937	-0.065	0.780	1.127	0.919	-0.085	0.652	1.294
		(0.079)				(0.094)				(0.175)		
Pacific	0.706	-0.347***	0.607	0.822	0.770	-0.261***	0.644	0.921	0.791	-0.235	0.571	1.095
		(0.077)				(0.091)				(0.166)		
Sector (Baseline: Non-hi-tech)												
High-tech	1.035	0.034	0.969	1.105	1.076	0.073*	0.990	1.169	1.328	0.284***	1.117	1.579
		(0.033)				(0.042)				(0.088)		

Table 4.3 Cox Model - OutcomeProfit (R/N/I) – cont.

VARIABLES	(1) Regional, National and International HR	Cox	95% Conf. Interval		(2) National and International HR	Cox	95% Conf. Interval		(3) International HR	Cox	95% Conf. Interval	
Have Business Idea (Baseline: No)												
BusinessIdea - Yes	0.967	-0.033	0.901	1.038	0.909	-0.095**	0.832	0.994	0.798	-0.225**	0.666	0.957
		(0.036)				(0.045)				(0.092)		
Business Plan Initiated (Baseline: No)												
BusinessPlanInitiated - Yes	1.001	0.001***	1.000	1.002	1.002	0.002***	1.001	1.002	0.999	-0.001	0.997	1.001
		(0.000)				(0.001)				(0.001)		
Preference for Firm Growth (Baseline: Easy Manage Size)												
Maximise Growth	0.661	-0.414***	0.609	0.707	0.652	-0.427***	0.589	0.722	0.964	-0.037	0.793	1.171
		(0.042)				(0.052)				(0.099)		
Defining Markets Initiated (Baseline: No)												
Defining Markets Initiated - Yes	1.004	0.004***	1.003	1.005	1.006	0.007***	1.005	1.008	1.004	0.004***	1.001	1.007
		(0.001)				(0.001)				(0.001)		
External Funding Received (Baseline: No)												
ExternalFundingReceived - Yes	1.001	0.001***	1.001	1.002	1.003	0.003***	1.002	1.004	0.994	-0.006***	0.992	0.996
		(0.000)				(0.000)				(0.001)		
Got Internet/Phone Listing (Baseline: No)												
Internet/Phone Listing - Yes	1.007	0.007***	1.006	1.008	1.008	0.009***	1.007	1.009	1.008	0.008***	1.006	1.010
		(0.000)				(0.001)				(0.001)		
Obtained Business Registration Number (Baseline: No)												
BusinessRegistered - Yes	1.008	0.008***	1.007	1.009	1.007	0.007***	1.006	1.008	1.012	0.012***	1.010	1.013
		(0.000)				(0.000)				(0.001)		
Age	0.963	-0.037***	0.948	0.978	0.935	-0.067***	0.918	0.954	1.038	0.037	0.987	1.091
		(0.008)				(0.010)				(0.026)		
c.Age#c.Age	1.000	0.000***	1.000	1.000	1.001	0.001***	1.000	1.001	0.999	-0.001**	0.999	1.000
		(0.000)				(0.000)				(0.000)		
BornInTheCountry (Baseline: Born outside country)												
BornInTheCountry - Yes	1.141	0.132**	1.000	1.302	1.892	0.638***	1.526	2.346	5.720	1.744***	2.937	11.137
		(0.067)				(0.110)				(0.340)		
Gender (Baseline: Male)												
Female	0.854	-0.157***	0.803	0.909	0.710	-0.343***	0.654	0.770	1.140	0.133	0.968	1.347
		(0.032)				(0.042)				(0.084)		
Time Devotion (Baseline: Not F/T)												
Full Time Basis	1.004	0.004***	1.003	1.005	1.004	0.004***	1.003	1.005	1.010	0.010***	1.008	1.012
		(0.000)				(0.000)				(0.001)		
Project (Baseline: PSED II)												
US PSED I	1.126	0.119***	1.045	1.214	1.279	0.246***	1.163	1.407	0.844	-0.169	0.689	1.034
		(0.038)				(0.049)				(0.103)		
Observations		39,096				39,096				39,096		
Standard errors in parentheses												
*** p<0.01, ** p<0.05, * p<0.1												
Cox Model												

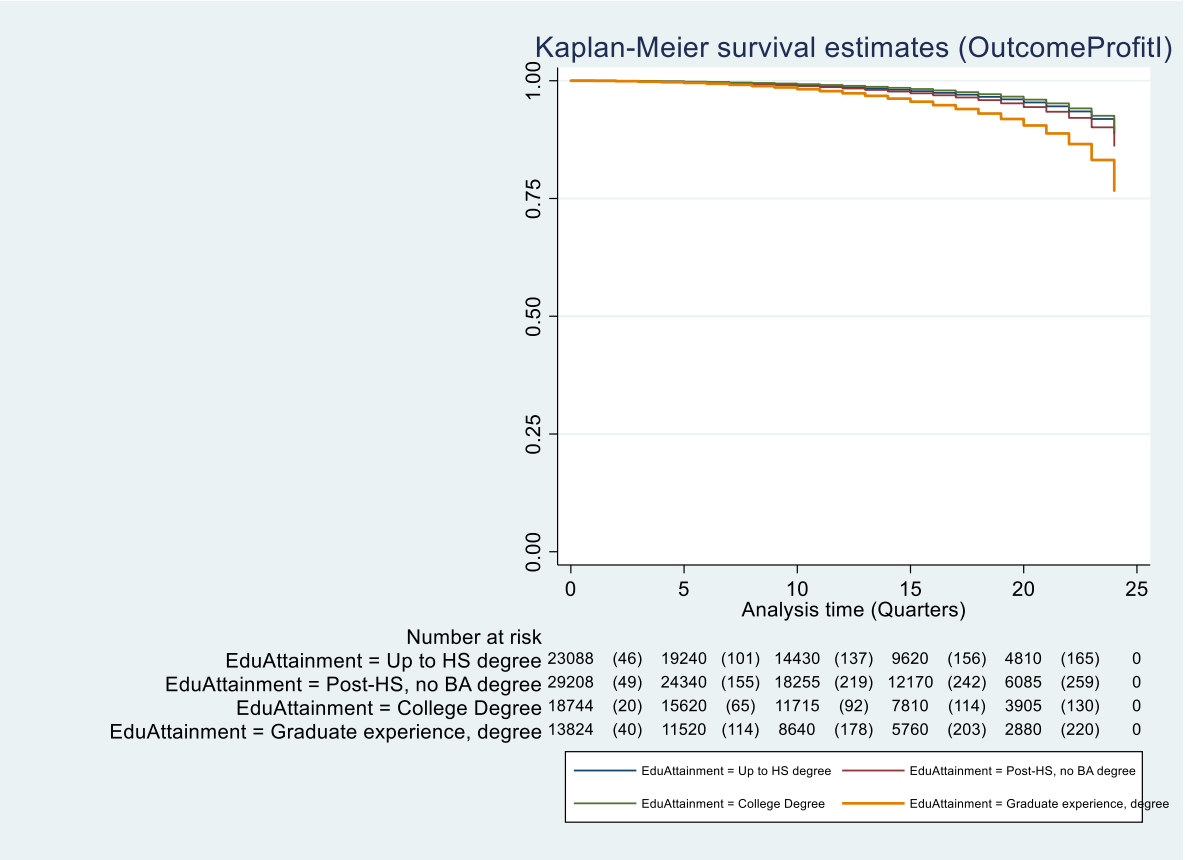
Table 4.4 Competing risks model - OutcomeProfit (R/N/I)

VARIABLES	(4) Regional, National and International SHR	Competing Risks Model	95% Conf. Interval		(5) National and International SHR	Competing Risks Model	95% Conf. Interval		(6) International SHR	Competing Risks Model	95% Conf. Interval	
Educational Attainment (Baseline: Up to HS degree)												
Post-HS, no BA degree	1.154	0.144***	1.064	1.252	1.044	0.043	0.938	1.163	1.588	0.462***	1.246	2.024
		(0.041)				(0.055)				(0.124)		
College degree	0.920	-0.084*	0.841	1.006	1.023	0.023	0.911	1.149	1.477	0.390***	1.139	1.916
		(0.046)				(0.059)				(0.133)		
Graduate experience, degree	1.220	0.199***	1.108	1.344	1.353	0.303***	1.196	1.531	1.768	0.570***	1.344	2.325
		(0.049)				(0.063)				(0.140)		
Startup Experience (Baseline: No StartupExp)												
Have Startup Experience	1.026	0.025	0.965	1.090	1.018	0.018	0.938	1.106	1.780	0.577***	1.479	2.142
		(0.031)				(0.042)				(0.094)		
Work Experience (Baseline: No work Experience)												
Have work Experience	1.863	0.622***	1.337	2.596	1.072	0.070	0.766	1.501	0.259	-1.349***	0.183	0.368
		(0.169)				(0.172)				(0.179)		
Industry Experience (Baseline: No IndustryExp)												
Have Industry Experience	1.072	0.070*	0.999	1.151	1.038	0.037	0.945	1.139	0.639	-0.447***	0.531	0.770
		(0.036)				(0.048)				(0.095)		
Team Size (Baseline: One owner)												
Two owners/team members	1.081	0.078**	1.016	1.150	0.824	-0.194***	0.757	0.896	0.431	-0.841***	0.349	0.533
		(0.032)				(0.043)				(0.108)		
Three or more owners/team members	0.969	-0.031	0.882	1.064	1.094	0.090	0.980	1.220	0.907	-0.097	0.715	1.151
		(0.048)				(0.056)				(0.121)		
Census Divisions (Baseline: New England)												
Middle Atlantic	0.730	-0.314***	0.632	0.844	0.473	-0.748***	0.390	0.574	0.415	-0.879***	0.284	0.607
		(0.074)				(0.099)				(0.194)		
South Atlantic	0.909	-0.095	0.792	1.044	0.815	-0.204**	0.686	0.969	0.459	-0.779***	0.326	0.646
		(0.071)				(0.088)				(0.174)		
East South Central	0.689	-0.373***	0.575	0.825	0.842	-0.172	0.685	1.035	0.277	-1.283***	0.175	0.439
		(0.092)				(0.105)				(0.234)		
West South Central	0.802	-0.221***	0.697	0.923	0.709	-0.344***	0.597	0.842	0.159	-1.835***	0.102	0.248
		(0.072)				(0.088)				(0.226)		
East North Central	0.958	-0.043	0.827	1.110	0.676	-0.392***	0.556	0.821	0.255	-1.365***	0.165	0.396
		(0.075)				(0.099)				(0.223)		
West North Central	0.836	-0.178**	0.718	0.975	0.570	-0.562***	0.464	0.700	0.834	-0.182	0.573	1.214
		(0.078)				(0.105)				(0.191)		
Mountain	0.915	-0.089	0.790	1.059	0.934	-0.069	0.783	1.113	0.934	-0.068	0.681	1.281
		(0.075)				(0.090)				(0.161)		
Pacific	0.678	-0.388***	0.588	0.783	0.741	-0.300***	0.624	0.879	0.744	-0.296*	0.544	1.017
		(0.073)				(0.087)				(0.160)		
Sector (Baseline: Non-hi-tech)												
High-tech	1.016	0.016	0.955	1.081	1.064	0.062	0.982	1.153	1.360	0.308***	1.142	1.621
		(0.032)				(0.041)				(0.089)		

Table 4.4: Competing Risks Model - OutcomeProfit (R/N/I) – cont.

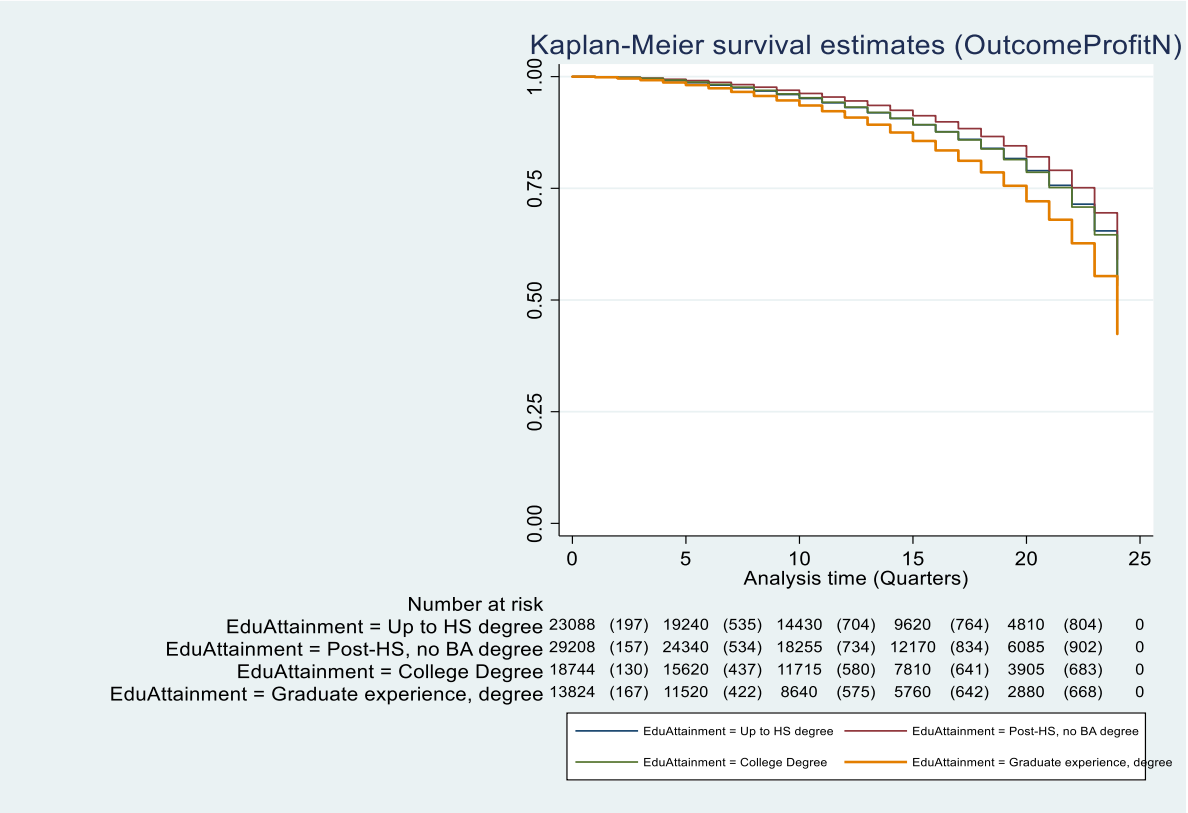
VARIABLES	(4) Regional, National and International SHR	Competing Risks Model	95% Conf. Interval		(5) National and International SHR	Competing Risks Model	95% Conf. Interval		(6) International SHR	Competing Risks Model	95% Conf. Interval	
Have Business Idea (Baseline: No)												
BusinessIdea - Yes	0.981	-0.019	0.918	1.048	0.921	-0.083*	0.843	1.005	0.779	-0.249**	0.640	0.948
		(0.034)				(0.045)				(0.100)		
Business Plan Initiated (Baseline: No)												
BusinessPlanInitiated - Yes	1.002	0.002***	1.001	1.002	1.002	0.002***	1.001	1.003	0.999	-0.000	0.998	1.002
		(0.000)				(0.001)				(0.001)		
Preference for Firm Growth (Baseline: Easy Manage Size)												
Maximise Growth	0.649	-0.433***	0.599	0.703	0.626	-0.468***	0.565	0.694	0.930	-0.073	0.756	1.144
		(0.041)				(0.052)				(0.106)		
Defining Markets Initiated (Baseline: No)												
Defining Markets Initiated - Yes	1.003	0.003***	1.002	1.004	1.006	0.006***	1.005	1.008	1.003	0.003***	1.001	1.006
		(0.000)				(0.001)				(0.001)		
External Funding Received (Baseline: No)												
ExternalFundingReceived - Yes	1.002	0.002***	1.001	1.003	1.003	0.004***	1.003	1.004	0.994	-0.006***	0.992	0.996
		(0.000)				(0.000)				(0.001)		
Got Internet/Phone Listing (Baseline: No)												
Internet/Phone Listing - Yes	1.007	0.007***	1.006	1.008	1.009	0.009***	1.008	1.010	1.009	0.009***	1.007	1.011
		(0.000)				(0.001)				(0.001)		
Obtained Business Registration Number (Baseline: No)												
BusinessRegistered - Yes	1.009	0.009***	1.009	1.010	1.008	0.009***	1.008	1.009	1.013	0.013***	1.010	1.015
		(0.000)				(0.000)				(0.001)		
Age	0.964	-0.037***	0.950	0.978	0.939	-0.063***	0.921	0.957	1.045	0.044*	0.999	1.093
		(0.008)				(0.010)				(0.023)		
c.Age#c.Age	1.000	0.000***	1.000	1.000	1.001	0.001***	1.000	1.001	0.999	-0.001***	0.999	1.000
		(0.000)				(0.000)				(0.000)		
BornInTheCountry (Baseline: Born outside country)												
BornInTheCountry - Yes	1.210	0.191***	1.061	1.380	2.029	0.707***	1.640	2.509	6.250	1.833***	3.044	12.833
		(0.067)				(0.108)				(0.367)		
Gender (Baseline: Male)												
Female	0.841	-0.173***	0.792	0.893	0.704	-0.351***	0.650	0.763	1.136	0.128	0.971	1.330
		(0.031)				(0.041)				(0.080)		
Time Devotion (Baseline: Not F/T)												
Full Time Basis	1.004	0.004***	1.004	1.005	1.004	0.004***	1.003	1.005	1.011	0.011***	1.009	1.012
		(0.000)				(0.000)				(0.001)		
Project (Baseline: PSED II)												
US PSED I	1.288	0.254***	1.200	1.383	1.438	0.363***	1.315	1.572	0.931	-0.071	0.767	1.131
		(0.036)				(0.046)				(0.099)		
Observations		39,096				39,096				39,096		
Robust standard errors in parentheses												
*** p<0.01, ** p<0.05, * p<0.1												
Competing Risks Model												

Figure 4.2 Kaplan-Meier survival estimates (Educational Attainment – International scope)



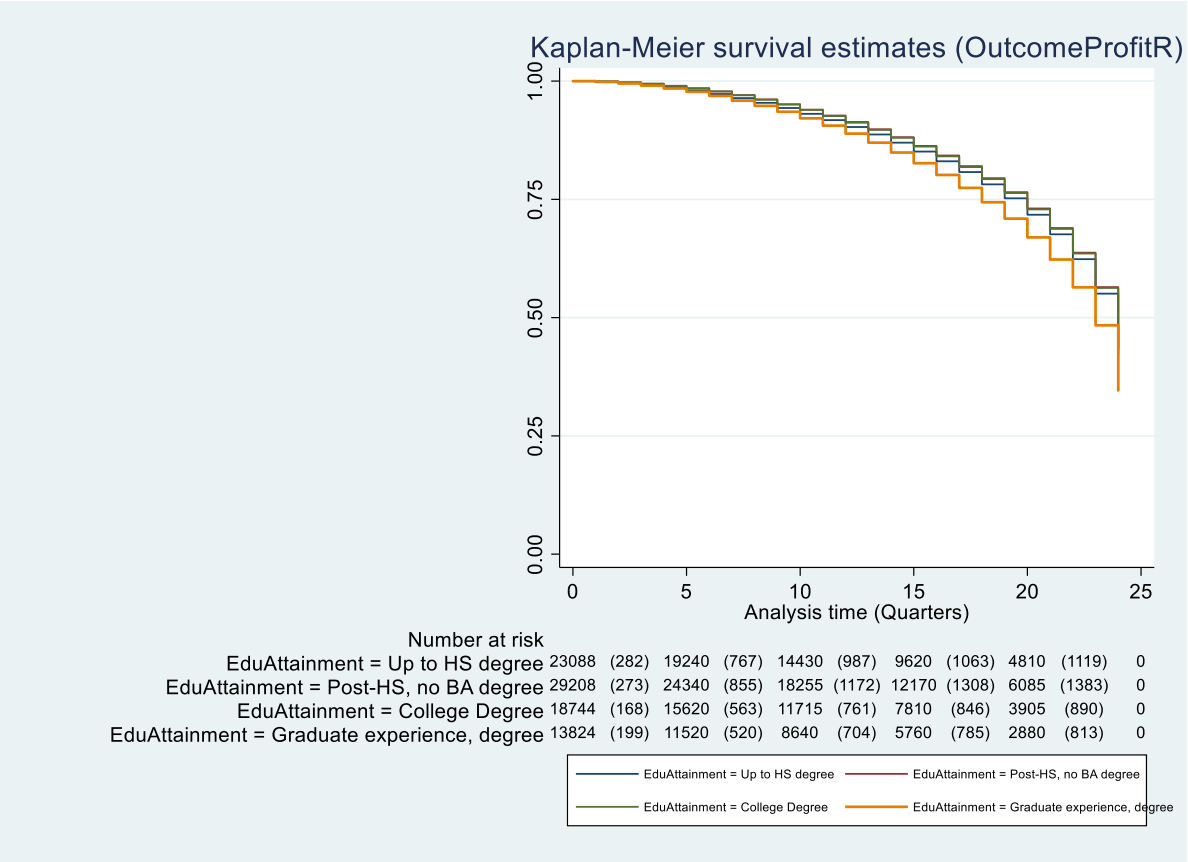
Hypothesis (H1a) stated that the likelihood that a nascent entrepreneur will create a profitable venture with international scope in a shorter duration of time is higher when a nascent entrepreneur has higher educational attainment. Nascent entrepreneurs with higher educational attainment, in both the Cox model (HR) and competing risks model (SHR), were found to have significantly higher likelihood (HR: 1.59, 95% CI 1.18 to 1.88; SHR: 1.77, 95% CI 1.34 to 2.32, respectively) and the results were significant ($p<0.01$).

Figure 4.3 Kaplan-Meier survival estimates (Educational Attainment – National and above scope)



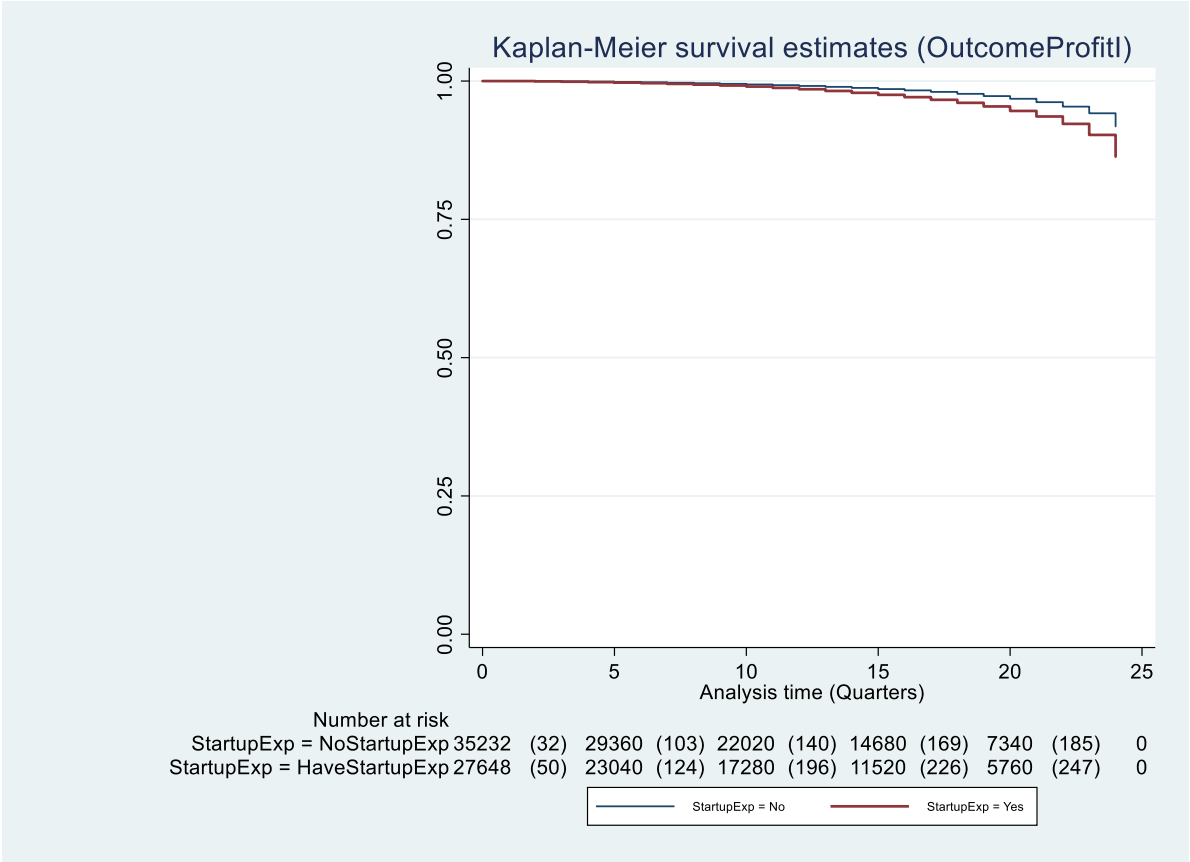
Hypothesis (H1b) stated that the likelihood that a nascent entrepreneur will create a profitable venture with national and above scope in a shorter duration of time is higher when a nascent entrepreneur has higher educational attainment. Nascent entrepreneurs with higher educational attainment, in both the Cox model (HR) and competing risks model (SHR), were found to have significantly higher likelihood (HR: 1.30, 95% CI 1.15 to 1.48; SHR: 1.35, 95% CI 1.20 to 1.53, respectively) and the results were significant ($p<0.01$).

Figure 4.4 Kaplan-Meier survival estimates (Educational Attainment – Regional, national and international scope)



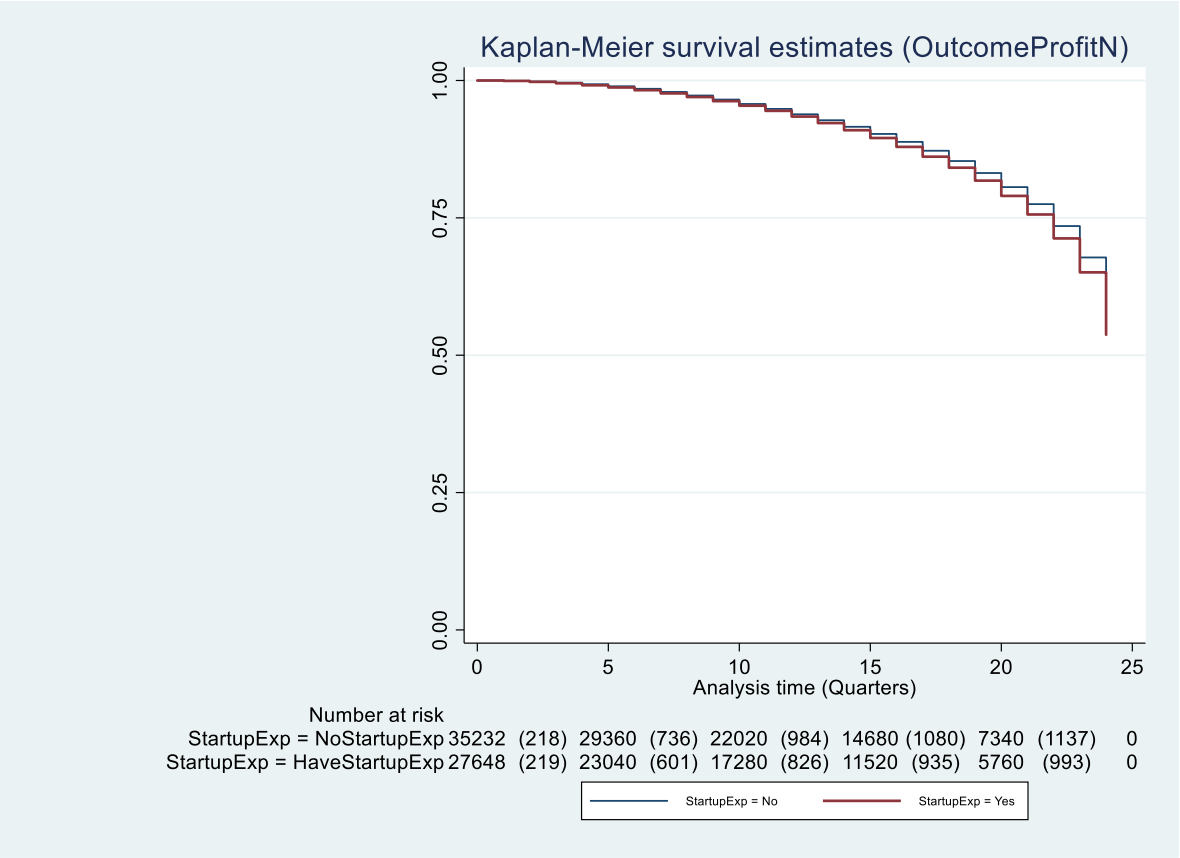
Hypothesis (H1c) stated that the likelihood that a nascent entrepreneur will create a profitable venture with a regional, national and international scope in a shorter duration of time is higher when a nascent entrepreneur has higher educational attainment. Nascent entrepreneurs with higher educational attainment, in both the Cox model (HR) and competing risks model (SHR), were found to have significantly higher likelihood (HR: 1.17, 95% CI 1.06 to 1.29; SHR, 1.22, 95% CI 1.11 to 1.34, respectively) and the results were significant ($p<0.01$).

Figure 4.5 Kaplan-Meier survival estimates (Start-up Experience – International scope)



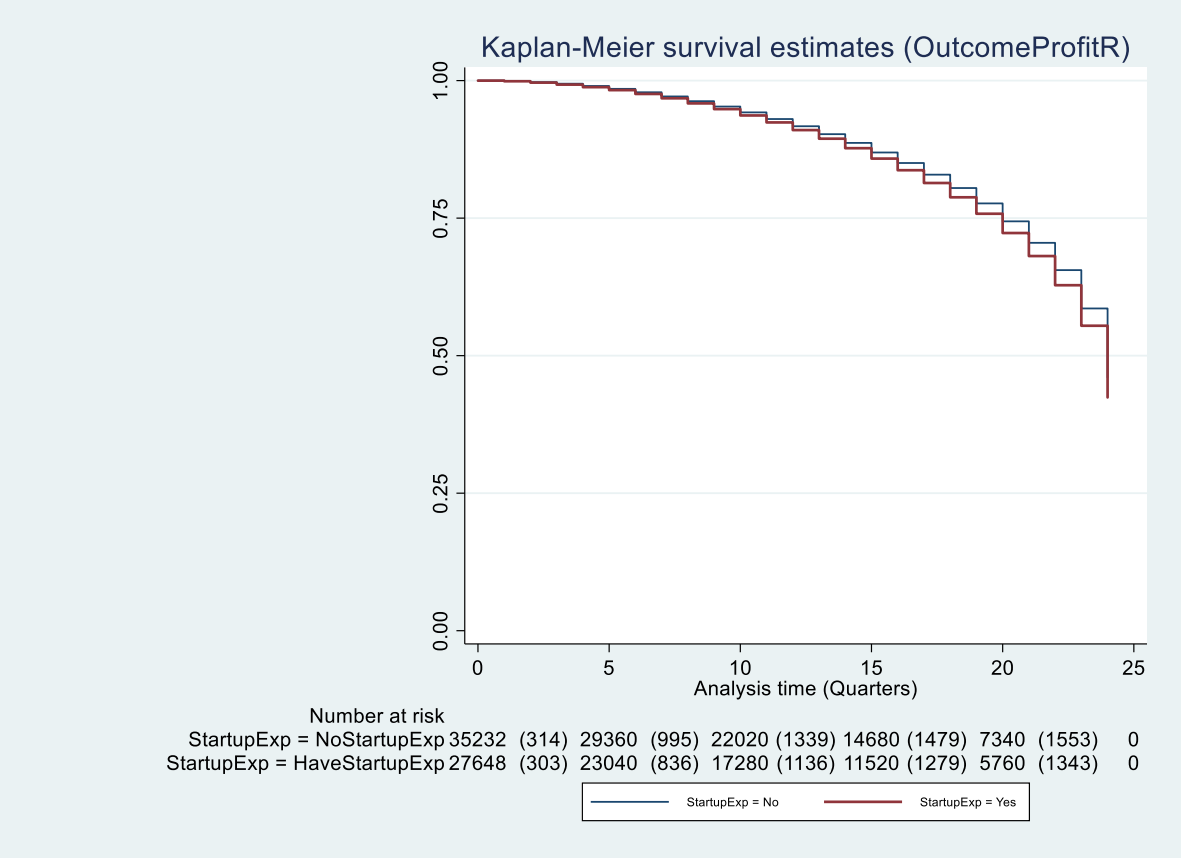
Hypothesis (H3a) stated that the likelihood that a nascent entrepreneur will create a profitable venture with international scope in a shorter duration of time is higher when a nascent entrepreneur has prior entrepreneurial experience. Nascent entrepreneurs with prior entrepreneurial experience, in both the Cox model (HR) and competing risks model (SHR), were found to have significantly higher likelihood (HR: 1.77 (95% CI 1.48 to 2.11); SHR, 1.78, 95% CI 1.48 to 2.14, respectively) and the results were significant ($p<0.01$).

Figure 4.6 Kaplan-Meier survival estimates (Start-up Experience – National and above scope)



Hypothesis (H3b) stated that the likelihood that a nascent entrepreneur will create a profitable venture with national and international scope in a shorter duration of time is higher when a nascent entrepreneur has prior entrepreneurial experience. Nascent entrepreneurs with prior entrepreneurial experience, in both the Cox model (HR) and competing risks model (SHR), were found to have marginally higher likelihood (HR: 1.03, 95% CI 0.95 to 1.12; SHR: 1.02, 95% CI 0.94 to 1.11, respectively) but the results were not significant.

Figure 4.7 Kaplan-Meier survival estimates (Start-up Experience – Regional, national and international scope)



Hypothesis (H3c) stated that the likelihood that a nascent entrepreneur will create a profitable venture with a regional or wider scope in a shorter duration of time is higher when a nascent entrepreneur has prior entrepreneurial experience. Nascent entrepreneurs with prior entrepreneurial experience, in both the Cox model (HR) and competing risks model (SHR), were found to have marginally higher likelihood (HR: 1.03, 95% CI 0.97 to 1.10; SHR: 1.03, 95% CI 0.97 to 1.09, respectively) but the results were not significant.

4.6 Discussion

In this section, I begin by discussing my findings and associated implications for theory building, after which I will highlight the methodological extension that I have presented and conclude this chapter with the underlying limitations.

This chapter examines the effect of the founder's human capital on the likelihood of shorter duration to profitable venture creation, at three spatial scopes/levels based on customer location (i.e. regional, national and international, national and above, and international). The results of the estimates of the Cox and competing risk duration models confirm the robustness of the results. Using the Harmonised PSED dataset (US cohorts), with over two thousand (2044) nascent ventures, the chapter highlights the value of individual human capital factors, particularly higher education, in being successful in all tiers of the spatial scope of sales. However, the effect of educational attainment is not linear, and I will provide my interpretations of this in the next section. Concerning the other general human capital factor, prior work experience is only found to be useful in the widest spatial scope of sales that includes regional, national, and international customers. The results of the founder's prior start-up experience indicate that it is beneficial for founders with venture creation with the international spatial scope of sales.

Contrary to the hypothesised linear association between educational attainment and shorter duration to a profitable outcome, the results show an inverted S-shaped curve. Although a nascent entrepreneur's higher educational attainment is more valuable (i.e. significant and the highest hazard rate) in creating a profitable new venture in a shorter duration for all spatial scopes of sales, having a post-high school qualification also provides nascent entrepreneurs with an advantage as compared to the college degree holders but only at regional, national and international, and international scope. The result of post-high school qualification is in line with the claims by Rodriguez and Lieber (2020) that this experience is good enough to provide entrepreneurs with both cognitive and non-cognitive skills to help them with entrepreneurial careers. Particularly from the regional, national and international point of view, the results support Barnard, Pittz and Vanevenhoven's (2019) arguments that post-high schools' curricula are designed to cater to local demand and that provide these students good chances to capitalise on regional opportunities.

From a higher education perspective, the results are in line with the finding that nascent entrepreneurs with higher educational attainment are more likely to export (Muñoz-Bullón, Sánchez-Bueno and Vos-Saz, 2015); benefit more from the high added value feature of entrepreneurial activity at exporting/different spatial scope (Aparicio, Audretsch and Urbano,

2021; Kim and Li, 2014); and that educational attainment has the greatest influence on venture's export performance (Mubarik, Devadason and Govindaraju, 2020). An interesting observation on educational attainment is also that the direction (i.e. of the sub-hazard rate) and strength (significance) increase as we move from the widest (i.e. regional, national and international) to the narrowest (international models).

The findings show that individuals with more transferable, the general human capital, are more likely to exploit potentially more profitable opportunities in varying regional environments (Qian, Acs and Stough, 2013) benefiting from them being better at attracting more customers and organise production processes (Cueto, Suárez and Mayor, 2021). Moreover, my findings are in line with research that the general human capital in terms of the skills, capabilities and knowledge acquired through education is indeed more transferable to numerous settings as compared to the specific human capital acquired through work experience in a specific industry, being context specific and hence less transferable and useful beyond a particular context (Kallmuenzer *et al.*, 2021).

The advantages these nascent entrepreneurs have over others point to that educational attainment does nurture creativity and innovation skills, and boosts data analysis and information processing speed to find efficient and timely solutions to issues faced while pursuing entrepreneurial opportunities (Kallmuenzer *et al.*, 2021). Moreover, education increases venture performance through better resource allocations and make individuals better at identifying and utilising potential opportunities (Huggins, Prokop and Thompson, 2017; Millán, Congregado and Román, 2012), which can be linked to my findings that show how useful it is in the wider spatial scope of sales. It is also clear that higher educational attainment in particular helps individuals in managing challenges associated with a wider scope of venture operation helped by greater knowledge and better decision-making in relatively complex environments such as the international spatial scope of business (Cerrato and Piva, 2012). Higher educational attainment is found to have a better export performance which can be also due to better networking abilities (Ashourizadeh *et al.*, 2014) and the competitive advantage these individual have over others in terms of new product development that help expand the spatial scope of sales (López Rodríguez and Serrano Orellana, 2020).

With respect to the founder's prior start-up experience, as an important determinant of shorter duration to a profitable outcome, the result only supports the hypothesis on the international spatial scope of sales. The research implication is that the founder's entrepreneurial experience not only positively impacts the international scope (D'Angelo and Presutti, 2019) outcome (i.e. profitable) but also shortens the duration of the likely profitable outcome. These

results hold after controlling for an extensive set of factors at the individual founder and location (census divisions) levels. Considering census divisions, to account for any impact of being a border state on regional, national, and/or international spatial scope of sales, was important as Jørgensen (2014) has argued that expanding to the nearest border may be less time-consuming than internationalisation. Moreover, the venture's geographical proximity to its key customers reduces its innovativeness (Presutti *et al.*, 2019) and therefore nascent entrepreneurs with an international scope are better at creating profitable ventures within a shorter period of time. With respect to contrary findings on regional, national and international, and national and above hypotheses, I would argue that regional and national start-up experiences may not be transferable to another venture creation process because all ventures are somewhat different (Muñoz-bullon, Sanchez-bueno and Vos-saz, 2015) and due to differences in market context and the pace required to expand (Blesa and Ripollés, 2021). My analysis also points to prior start-up experience being a strong predictor of the venture's potential to grow a wider spatial scope of sales, as with the accumulated entrepreneurial experience, these individuals are more capable to seize growth opportunities in terms of widening the spatial scope of sales (Ughetto, 2016).

As highlighted and expected earlier in this chapter, from a venture internationalisation (single scope) perspective, work experience is found to slow the process of profitable venture creation. Prior work experience is found to be effective only at the regional, national and international spatial scope, which suggests that international market opportunities are relatively complex to pursue than the local ones and that competitiveness parameters may differ in foreign markets in contrast to the domestic markets (Vaillant and Lafuente, 2019; Vendrell-Herrero *et al.*, 2017). Moreover, although nascent entrepreneurs with work experience benefit from their networks (Mueller, 2006) but the benefit, in terms of shorter duration to profitable new venture creation, is less likely to be transformable to the international scope. Similarly, the founder's prior industry experience is only valuable at the regional, national and international spatial scope of sales as compared to the national and international, and international scope. This again shows that international market opportunities are relatively more complex to pursue than local ones and that competitiveness parameter may differ in foreign markets in contrast to the domestic markets (Vaillant and Lafuente, 2019; Vendrell-Herrero *et al.*, 2017).

My finding, in particular, highlights that the specific (work experience and industry experience) type of human capital within the general and specific human capital generates different outcomes, and is of advantage at regional, national and international spatial scope of sales, but not for international scope in terms of the duration to a profitable venture launch. Moreover,

the chapter highlights how different human capital factors within general and specific human capital factors impact internationalisation differently (Jiang *et al.*, 2020) i.e. only higher educational attainment, post-high school, and prior start-up experience shorten the duration of a profitable venture creation with an international scope. This suggests that founders through their educational experiences and prior start-up experiences enjoy the benefits of 'fast learning' and 'the ability to efficiently utilise one's human capital'. This finding addresses the research gaps on how human capital can reduce or accelerate the duration of internationalisation (Onkelinx, Manolova and Edelman, 2016b).

The results fit well into the human capital theory, both conceptually and empirically, on why different types of general and specific human capital may influence entrepreneurial process outcomes differently, and in this chapter's case, on the duration to a profitable outcome at the different spatial scopes of sales. By applying the human capital theory to a wider context (different spatial scope) and not just internationalisation and/or speed of internationalisation, I have broadened the perspective on the predictive power of human capital theory to explain the marginal rate of return (Moog, 2002), which is a shorter duration to a profitable outcome on human capital investments (e.g. return on an additional level of education).

My chapter has three contributions. First, the chapter provides an important insight into the duration variability and the likelihood of a profitable venture outcome for nascent entrepreneurs with different spatial scopes of sales and that venture creation with the international spatial scope is much quicker than ventures with other broader (i.e. regional, national and international) spatial scope. This is an important contribution as previous research has argued that entrepreneurs with foreign customers (proximal distance/geographical base) are exposed to different dynamics of the foreign markets and competition, which can lead them to enhanced knowledge and better innovativeness (Estrin, Korosteleva and Mickiewicz, 2020). This chapter has theoretical implications for research geographical scoping (the external environment) and a profitable new venture creation in a shorter duration of time by focusing on enablers in the entrepreneurial process and how they differ and whether they are predictable concerning the extent of uncertainty and dynamics involved in different spatial scope (Rauch and Hulsink, 2021). This is important as previous entrepreneurial process research has limitations in terms of time dimension when studying internationalisation and innovation (Estrin, Korosteleva and Mickiewicz, 2020); treated entrepreneurial process duration as a control and not as an outcome (Lichtenstein *et al.*, 2007); have largely focused on venture creation but have ignored studying a profitable venture creation as an outcome; and studying the effect of human capital factors from geographical distance/location perspective (Huggins, Prokop and Thompson, 2017). Moreover, previous

studies have reported that spatial scope can delay profitability due to recovery of higher initial investment (García-Cabrera, García-Soto and Olivares-Mesa, 2019) and entrepreneurs may therefore limit their geographic scope to home regions to avoid additional (time and financial) costs (Shepherd and Patzelt, 2021). I have not only attempted to add to the discussion on how a founder's human capital factors contribute towards the likelihood of shorter duration to a profitable outcome with the different spatial scope of sales, and have also attempted to address research limitations that were present due to only studying firm-specific factors and duration in the cross-border/internationalisation-performance relationship (Abdi and Aulakh, 2018). This has also helped clear some doubts about speed as a criterion of success because research by Crick, Crick and Chaudhry (2020) suggested that founders' risk-taking behaviour and attempts to expand too quickly, expose them to risks associated with inadequate preparation and validation of procedures, limited understanding of customer needs, and eventually withdrawing from overseas markets.

The chapter's second contribution is in line with the International Entrepreneurship (IE) literature, which suggests that not all types (e.g. born global and international new ventures) of new ventures with different spatial scopes of sales benefit equally from the founder's human capital. The approach in this chapter shifts the focus from the human capital role to a specific spatial scope (e.g. regional or international) to multiple spatial scopes of sales and provides a new theoretical foundation for a profitable venture creation duration to help explain the positive and negative duration effects of founder's human capital on the duration and outcome of the entrepreneurial process. For instance, the founder's general human capital (i.e. educational attainment) has a more persistent effect on the venture's export propensity at all spatial scopes of sales than the specific human capital (Stucki, 2016). Despite the rich literature on the founder's human capital and venture outcome (Jafari-Sadeghi, Nkongolo-Bakenda, *et al.*, 2020; Kato, 2020; Ahmed and Brennan, 2019), little attention has been given to the duration and geographical scoping and how 'human capital- spatial scope-duration' fit can play a role in enhancing the likelihood of creating a profitable venture in a shorter period. In this way, in this chapter, I theoretically elaborate on the extent (i.e. the likelihood), and the direction (i.e. significance for the different spatial scope of sales) to which the founder's human capital, both general and specific, is conducive to enhancing a profitable outcome in a shorter period. In doing so, the chapter has not only addressed calls for the further need for clarity on the speed-performance relationship of internationalisation (Prashantham and Young, 2011) but have enhanced our understanding of entrepreneurial process outcome for nascent entrepreneurs with a different spatial scope of sales. My finding has therefore helped in having a better insight into a rather limited research area of the temporal dimension of human capital and its

implications for the different spatial scopes of sales (Lehmann, Schenkenhofer and Wirsching, 2019).

Finally, in this chapter, I advance the discussion on contextualising entrepreneurship research (Tavassoli, Jienwatcharamongkhol and Arenius, 2022; Welter, 2011), theorising and empirically investigating the relationship between the founder's human capital and the venture's spatial scope of sales. Methodologically, my study demonstrates how the spatial scope of sales effect can be incorporated into a nested model, while also testing for a relationship at the founder's human capital levels. By doing so I have also attempted to respond to the need to incorporate similar models in international business research (Elango and Wieland, 2017). I have developed a nested model that cut across levels of analysis and can assist in theorising different level effects (Welter, 2011), in my case, narrow to the wider spatial scope of sales. In this chapter therefore I contribute to a better understanding of the cross-link (Davidsson, 2020) between a founder's human capital and the spatial scope in nascent entrepreneurship research by comparing different dimensions (spatial scope of sales) and characteristics (human capital). This is important as most studies in the past had a unit of study as a firm (Del Sarto *et al.*, 2021; Jiang *et al.*, 2020; Puig, Gonzalez-Loureiro and Ghauri, 2018; Sadeghi, Rose and Chetty, 2018; Chetty, Johanson and Martín Martín, 2014; Musteen, Datta and Francis, 2014; Autio, George and Alexy, 2011), and not many of them have focused on founder level human capital, which has been found critical in start-up internationalisation (Jiang *et al.*, 2020) and without giving attention to different spatial scopes.

The chapter also has practical implications. First, the chapter's findings signal to a nascent founder the importance of taking into account his/her human capital characteristics when deciding on the spatial scope of sales for the new venture creation process. If they decide to start on multiple/wider spatial scope of sales, then at least these findings can help them to have a better perspective of the time duration to a profitable outcome based on a different level of geographical scoping e.g. the narrower the spatial scope (i.e. international) and the higher level of individual's educational attainment, the higher the likelihood of creating a profitable in a shorter period of time. Moreover, the start-up experience can be of great use in nascent entrepreneurs' endeavours on the international scope as compared to regional and national spatial scope. The chapter's framework also offers research opportunities on how nascent entrepreneurs can strategically make use of the spatial scope, as highlighted by Davidsson, Recker and Von Briel (2020) of the temporal scope, which refers to the duration of enablement.

Second, concerning nascent entrepreneurship policy, investment in human capital can be better tailored to support planned geographical entrepreneurial activity level and growth based on a targeted intervention (i.e. human capital vis-à-vis the spatial scope of sales), both at the government level initiatives and with private incubators and accelerators. This is important because entrepreneurs need some key resources to start creating new and successful ventures (Davidsson, 2020), which from this chapter's perspective, is the right type of human capital with the general and specific human capital factors. Moreover, policies and programs designed to encourage venture creation should provide a realistic timescale for reaching profitability, which will also deter premature disengagement (Reynolds, 2018).

4.6.1 Limitations

There are at least three limitations to this chapter, one is with regards to the Covid19 pandemic which has offered higher flexibility of working from home (Zettel and Garrett, 2021), and although the US PSED cohorts capture part-time and full-time engagement they do not capture the internet-based work from home aspect which may affect geographical scoping by the nascent entrepreneurs. Second, PSED surveys focus on detailed information for one founder per nascent venture, and though it has other team members' variables, the data overlooks specific team members' contributions (Alomani, Baptista and Athreye, 2022), which may limit the generalisability of the findings (Tavassoli, Jienwatcharamongkhol and Arenius, 2022). Third, the chapter mainly focused on the human capital factors, and social capital aspects could be taken into account, which was not available in the harmonised datasets. In terms of related future studies, I would suggest and agree with Terjesen, Hessels and Li (2016) on the possibility of integrating human capital theory with economic perspectives to assess how different human capital factors translate entrepreneurship into growth.

4.6.2 Conclusion

My analysis points out the knowledge gap in studying the spatial scope of sales for a better holistic view of born global (rapid and usually international expansion) and international new ventures (that gradually expand by having a step-by-step approach) that are impediments to understanding the determinants of duration of born global versus internationalisation models. This chapter analyses the human capital determinants of profitable venture creation in a shorter period of time for nascent entrepreneurship. After applying the competing risk models, in addition to the conventional Cox model, the results obtained are robust. This chapter contributes to the literature on nascent entrepreneurship and the entrepreneurial process by not only empirically testing the impact of human capital at the different spatial scopes of sales

but also bringing in the duration and profitable outcome perspective. The implications of this chapter are that not all factors within the general and specific human capital effects venture outcomes equally. In fact, the likelihood/impact of industry and general work experience moves in a different direction than the educational attainment and start-up experience, which will serve a wider audience in the ecosystem including the nascent entrepreneurs, scholars, policymakers, and practitioners to better resource allocation for the desired outcome. These empirical findings would therefore help the wider stakeholders to better negotiate their way and/or extend their support towards an enlarged geographical scoping by the nascent entrepreneurs. The chapter highlights to the policymakers that investment in higher education and encouraging start-up culture can effectively develop opportunities for a start-up that has a wider and more successful spatial scope.

Chapter 5: Conclusions

The main body of my thesis is composed of three empirical chapters (chapters 2 to 4) on the relationship between the founder's human capital, the duration to different entrepreneurial process outcomes, and the spatial scope of sales. Nascent entrepreneurship is considered the essence of entrepreneurship and I follow the argument that entrepreneurial process research should expand beyond just studying the economic constraints (e.g. financial resources and ability to borrow) and widen its scope to expand current research on human capital constraints of nascent entrepreneurs (Parker, 2018a). Studying nascent entrepreneurship has two key advantages. First, it follows all founders within the process and hence avoids the survival bias of studying only those who were able to create new ventures. Second, it eliminates chances of any hindsight bias by asking those founders who managed to create new ventures, about events in the past, and therefore those responses might be exposed to selected interpretation, memory loss or even misreporting of the events (Parker, 2018a). This is important because my chapters focus on profitable ventures created (incl. different spatial scopes of sales) and the founder's disengagement, and the PSED design helps in eliminating any survival and/or hindsight bias. Furthermore, the need for individual-level research from the time and time management perspective has been identified to study entrepreneurial process outcomes (Lévesque and Stephan, 2020), since time is considered an investment in new venture creation (Shim and Davidsson, 2018) and the process is considered as a directional and temporal journey towards the intended entrepreneurial process outcome, emphasising speed, time and duration (Davidsson and Gruenhagen, 2021). The ambition of this thesis has therefore been to understand determinants and the effects of the founder's human capital factors on entrepreneurial process outcomes. It aims to contribute to the body of research on nascent entrepreneurship and observable entrepreneurial process outcomes. In this chapter, I present my general contributions to the respective bodies of literature as well as the contributions of particular chapters. I review and discuss my results with respect to the conceptual framework presented in the introduction chapter (Chapter 1), outline current limitations in the study of entrepreneurial process duration and nascent entrepreneurship and propose avenues for further research.

5.1 Chapter summaries

In the first empirical study (chapter 2), I consider the impact of nascent entrepreneurs' human capital, both general and specific, and of their age, on the duration of the business start-up process until a positive (profitable) outcome. Although the founder's human capital and

venture outcome (mostly firm-level survival) have been studied, the duration perspective was missing. Studying duration and a clear outcome (i.e. profitable new venture creation) is important because the entrepreneurial process is inconstant in duration (Davidsson and Gruenhagen, 2021), which can span from a few months to over 10 years (Reynolds, 2016). Moreover, I have studied the direct impact of age groups on the likelihood of shorter duration to a profitable outcome. This is particularly important because inadequate theoretical attention to an entrepreneur's age, often treated as a control variable, has not helped to empirically establish how older and younger entrepreneurs differ in terms of entrepreneurial success (Zhao *et al.*, 2021). In addition to human capital factors and the founder's age, I have also looked into the interaction effect between the founder's education and hi-tech ventures because industry-specific (e.g. hi-tech/non-hi-tech) entrepreneurship processes vary in terms of the duration, time management, and venture outcomes (Lévesque and Stephan, 2020).

I draw my conclusions based on estimating Cox and competing risks models using two US cohorts (PSED I & II) from the harmonised PSED data set and postulated that the founder's education level, higher education and hi-tech interaction, prior start-up experience, prior industry experience are essential in explaining the impact on the likelihood and duration to profitable venture creation. The findings suggest that post-high school and graduate degree holders are more likely to create profitable new ventures in a shorter duration. A similar impact of educational attainment has been seen with hi-tech ventures. This, a non-monotonic relationship, suggests that the basic knowledge and skills gained at post-high school qualification are also good enough to provide a duration advantage in creating a profitable new venture. Moreover, the benefit of higher education in terms of market research, commercialisation abilities, and efficient decision-making skills make these founders pursue relatively sophisticated ventures, which impact duration (Davidsson and Steffens, 2010). This is an interesting insight because it is not just that higher education is found to be weakly superior to compulsory schooling for opportunity identification (Ucbasaran, Westhead and Wright, 2008), but the same is true in terms of weak advantage over post-high school qualification in terms of operationalising the identified opportunity (i.e. launch of a profitable new venture in a shorter period of time). Hence, the 'more is better' assumption of the founder's education does not apply in to a shorter duration to a profitable new venture creation. This is important from the human capital theory perspective and in terms of a better assessment of founder's productive capacity to create a profitable new venture in shorter duration. The same holds for founders with higher education and pursuing hi-tech ventures. The reason why founders with lower qualification are also better at timing of creating new ventures is that it is more about the multi-tasking abilities (Jianwen (Jon), Welsch and Moutray,

2009) than the technical knowledge (MacVicar and Throne, 1992), which one would have gained in the university programmes.

Furthermore, from the analysis of founders' prior start-ups and prior industry experience in this chapter, it is clear these nascent entrepreneurs benefit from certain skills and behaviours they have learned through these experiences. These include having a realistic view of the challenges involved (Capelleras *et al.*, 2019), the ability to adapt to the context better (Markowska *et al.*, 2019), and enhanced information processing speed (Zahra and George, 2002), which positively impact start-up process performance (Mitchell, Mitchell and Mitchell, 2017) in terms of shorter duration to profitable venture creation. These findings also suggest that pre-entry specific human capital factors are more transferrable (applying the learning/knowledge) in terms of duration and a profitable outcome perspective. The relationship between the founder's age and the creation of profitable new ventures in a shorter duration is non-linear. The hypothesis is partially supported, in terms of older founders having the highest likelihood of creating profitable ventures in a shorter period of time. Older founders, therefore, are more likely to benefit from the accumulated resources in terms of social and professional networks (Parker, 2018a) and by pursuing less challenging opportunities (Kautonen, Down and Minniti, 2014), they are better at creating new profitable ventures relatively quickly.

In chapter 3, I present the second empirical study in the thesis. Here, I examine the relationship between the founder's human capital and age with the duration to the founder's exit (disengagement from the entrepreneurial process). It is important to study entrepreneurial exit from the founder's perspective because first, even with prolonged policies in the US to promote start-ups, one-third of entrepreneurs exit within two to three years. Second, human capital factors can contribute to an intelligent choice to exit by the founder that would help avoid financial, social and psychological costs (Amankwah-Amoah, Adomako and Berko, 2022; Morris, Soleimanof and White, 2020). I have also empirically tested for the interactions between the founder's general and specific human capital to access any impact on the likelihood and duration of the founder's disengagement from the entrepreneurial process.

For direct effect, I find strong support for the hypotheses tested on founders with work experience and prior industry experience. These founders tend to benefit from the variety of skills they acquire in different roles (Krieger, Block and Stuetzer, 2018) including functional skills (Hsieh, 2016), and their industry experience makes them set more realistic performance thresholds (DeTienne and Cardon, 2012), which contribute toward the lower likelihood of an early exit. In terms of prior start-up experience, the hypothesis is not supported (results not significant), which is in line with previous research on prior start-up experience and the

likelihood of exit (Coad *et al.,* 2016). Founder's educational attainment and the likelihood of their disengagement have shown a non-monotonic relationship. The findings highlight the benefit of better legitimacy enjoyed by the highly educated founder (Gimmon and Levie, 2010) that can help them to raise capital, establish networks, and customer acquisition, and therefore lower chances of disengagement. Similarly, it shows that for instance college degree holder founders' growth aspirations and opportunity costs (Capelleras *et al.*, 2019) make them more likely to opt for a voluntary exit outcome. In terms of post-high school qualified founders, they have a much lower likelihood of exit as they are less likely to find better external employment opportunities and hence decide to continue with the venture creation process. What is interesting to see is that when it comes to the human capital factors interactions, I find strong support for all of the hypotheses, except for the education and prior industry experience. The strong complementary effect is seen particularly with general human capital and previous start-up experience. The work experience exposes founders to the practicalities of venture management (Parker, 2018a) and the prior start-up experience provides them with enhanced capabilities to manoeuvre through the challenging venture creation process (Lafuente *et al.*, 2021), which results in a lower likelihood of an early exit. It is important to note the enhanced predictive power of the human capital theory when studying the combined effect of different forms of human capital in terms of duration to the founder's disengagement. In terms of higher educational attainment not able to provide specific start-up capabilities (Huggins, Prokop and Thompson, 2017) because start-up specific knowledge can only be acquired through practically going through prior start-up experience (Nguyen, 2019), the complimentary effect with prior star-up experience is significant and greatly decrease the likelihood of an early exit.

Furthermore, from the analysis of the founder's age, the relationship is non-linear and the hypothesis is partially accepted. The older group do have the lowest exit likelihood hazard rate, which can be explained by them benefitting more from their cognitive and social strengths over the younger founders (Zhao *et al.*, 2021) and also due to their higher exit costs in terms of fewer alternate employment opportunities.

Chapter 4 in the thesis presents the third empirical study which looks at the impact of nascent entrepreneurs' human capital, both general and specific, on the duration to a profitable venture creation duration with different spatial scopes of sales (i.e. regional, national and international, national and above, and international). Using a nested model, I draw my conclusions based on estimating Cox and competing risks models using two US cohorts (PSED I & II) from the harmonised PSED data set and postulated that the founder's human capital positively affects a shorter duration to profitable new venture creation for all spatial scopes of sales. The reason is that human capital accumulation, both generic factors which have wider transferability and specific factors, which are more context-specific, should provide these founders with an edge

across spatial scopes. The spatial scope of sales focus of my chapter is particularly important because the competitive advantages attained in local markets can benefit regional expansion and similarly a regional presence can provide support to the international scope of activities (Hånell, Nordman and Tolstoy, 2019). However, any step-by-step approach would mean an impact on the entrepreneurial process duration.

Furthermore, it is important to empirically test and found clarity on the founder's human capital's contribution to the different spatial scopes because widening spatial scope has been found to help achieve financial performance (Spence and Crick, 2006), but on the other hand, it has also found to delay profitability due to need for recovery of higher initial investment to enter the international market (García-Cabrera, García-Soto and Olivares-Mesa, 2019). This chapter also provides clarity on how the founder's human capital in terms of the spatial scope, aids in facing the liability of foreignness and benefits from learning and applying that learning (Estrin, Korosteleva and Mickiewicz, 2020) to their best advantage in terms of shorter duration to profitable venture creation. Moreover, the liability of foreignness and resource constraints grows with expanded spatial scope (Blesa and Ripollés, 2021), and how the founder's human capital benefits in sailing through those challenges is important to understand.

By having a duration perspective on a profitable venture creation at different spatial scopes of sales, this chapter will also provide a novel insight into the debate on rapid (born global) and gradual (international new ventures) (Wadeson, 2020) entrepreneurial paths to wider spatial scope. The prior start-up experience benefits the born-global (international scope) approach in terms of shorter duration to a profitable outcome. As the spatial scope widens, no significant impact of prior start-up experience is found, which is still relevant in a way that a less risky and cost-saving internationalisation approach would be time-consuming (Melén Hånell and Rovira Nordman, 2018).

The findings indicate that the founder's higher education aided an early launch of a profitable new venture at all spatial scopes of scales. However, founders with post-high school qualifications also tend to perform better than college degree holders on the regional, national and international, and international spatial scope of sales. This partially supports my hypothesis on educational attainment. In terms of higher education level and it is not specific to a particular context, a clear advantage across all different spatial scopes can be seen (Yavuz, 2021) in terms of positive influence on process outcome (Mubarik, Devadason and Govindaraju, 2020).

The effect of the founder's prior start-up experience is only found to be significant for ventures with an international scope in terms of shorter duration to profitability. This can be due to these founders being more targeted on specific international markets based on better assessment driven by their previous start-up exposure, even if it was domestic, which has been found to positively affects venture internationalisation (Jafari-Sadeghi, Kimiagari and Biancone, 2020). In terms of the regional, national and international, and national and above spatial scope, the results were not significant. This could be because a wider spatial scope would mean different markets and different contexts and impact on duration (Blesa and Ripollés, 2021), hence slowing down the process to profitable venture creation.

Both the founder's work experience as well as prior industry experience has been found significant in the case of the regional, national and international spatial scope of scale only. This points to the limitation of transferability of these two factors to national and international settings. Moreover, work experience and industry experience both provide founders with task variability skills and industry networks but they again would be region-specific, as compared to higher education or start-up experience which would give better exposure and diversity of networks to these founders, being it studying with a diverse cohort of national and international students at university, or dealing with supply chain stakeholders that can provide founders with better access to a national and international setting. This finding also suggests that work experience in a particular setting may facilitate spin-offs (Buenstorf, 2007) and these founders may choose to capitalise on regional opportunities first. One plausible explanation for work experience and industry experience, being particularly beneficial to entrepreneurs, is that their immediate (geographical distance) to the main customer base, which most entrepreneurs prefer to operate initially (Parker, 2018a), helps them in a profitable launch of new venture quickly. Work experience in the same industry also helps them in reaching profitability more quickly than those without experience (Oe and Mitsuhashi, 2013). This also suggests that these two human capital types particularly benefit from gradual (internationalisation strategy) expansion of the spatial scope.

5.2 Key contributions

This thesis makes several important theoretical contributions to the nascent entrepreneurship, human capital, and duration studies literature. It has implications for policies to support entrepreneurship. Moreover, it also has implications for the nascent entrepreneurs and practitioners to have a more realistic expectation of the likelihood and duration of their entrepreneurial process outcomes.

My thesis's first empirical chapter (Chapter 2) introduces the effects of the founder's human capital factors, and age on the likelihood and duration of profitable venture creation. I add to the literature by analysing how general and specific human capital, age and education-hi-tech interaction relate to a shorter duration to profitable venture creation. Unlike previous literature that focuses mostly on venture survival, start-up activity level constructs, and firm-level constructs to study the speed of the entrepreneurial process and that too without a specific measure of 'success', I can distinguish between the contribution, in terms of shorter duration, of different types of founder human capital and more importantly to observable criteria of outcome/success (i.e. profitable venture creation). This distinction is important from two perspectives. First, by adopting a temporal lens, I provided a better and more holistic insight into the contingent nature and relationships of human capital factors and their impact on the duration of a profitable outcome. This is important because the entrepreneurial process is time-variant (Leong, 2021) and inconstant in duration (Davidsson and Gruenhagen, 2021), and by moving away from the static view, we can improve our understanding of the founder's ability to apply their human capital based learning to achieve competitive advantage (Lévesque and Stephan, 2020; Peterson and Wu, 2021). This analysis added to the predictive power of the human capital theory in terms of entrepreneurial process duration and elaborates how the human capital factors help in applying learning to the entrepreneurial process that ensures a quicker profitable outcome for nascent entrepreneurs. I have provided empirical evidence on how the founder's specific human capital factors (i.e. prior start-up and industry experience) provide a clear advantage in duration and commercial (i.e. profitability) advantage to nascent entrepreneurs. Second, at the micro-level foundations of human capital, it is the individuals, who may have a higher level of human capital but how able they are to transfer the knowledge and skills to the venture creation process differs. In this chapter, I have also empirically evidenced that the 'more is better' approach to human capital is not necessarily sufficient to explain the entrepreneurial process efficiencies and outcomes. For instance, when it comes to formal education, there is a non-monotonic relationship, which shows that different levels of education can provide a good foundation for entrepreneurial productivity (Wright and Mcmahan, 2011).

I have also provided evidence of how different levels of educational attainment facilitate hi-tech venture creation duration. Founders with a university degree working on hi-tech start-ups have an edge in terms of a speedier launch of profitable new ventures, benefiting from their technical expertise, and networks established through their educational experience. A founder's formal qualifications (all levels), in general, facilitate duration to a profitable outcome, which means good transferability of all qualification levels. A plausible explanation could be that the first founders make an informed choice to pursue hi-tech start-ups, aided by

educational experience, and peace of mind that they can return to external employment opportunities, which make them more relaxed in terms of pursuing hi-tech ventures and focus on establishing new ventures in a shorter period of time. Moreover, regarding the founder's age and shorter duration to profitable venture creation, my findings are in contrast to previous findings on venture survival and show a non-linear relationship. Both younger and older founders manage to launch a profitable venture in a shorter duration, although older individuals have the highest likelihood. This shows that both the accumulated knowledge that comes with age and the energy and up-to-date knowledge that younger founders have, help in the speedier launch of a profitable new venture. For other researchers interested in duration studies, my methodological contribution in terms of adding the competing risks model to the traditional hazard model (Cox), would provide a more realistic assessment of the impact of human capital factors on the duration to a profitable outcome, while accounting for the other risk (i.e. founder's disengagement) present during the entrepreneurial process.

The second empirical chapter (Chapter 3) focuses on the role of human capital and age in the likelihood and duration of the founder's disengagement from the entrepreneurial process. A founder-level exit study is important because the founder's exit not only impacts the entrepreneur (Eklund, Levratto and Ramello, 2020) but also the industry, market and economy (DeTienne, McKelvie and Chandler, 2015; DeTienne, 2010). Moreover, literature on founder exit has mostly assumed exit as a failure, and caution has been advised in distinguishing between entrepreneurial exit and entrepreneurial failure (Rouse, 2016; Wennberg and DeTienne, 2014; Ucbasaran *et al.*, 2013), and hence an exit from venture creation process should be considered as a closure rather than a failure (Parker, 2018a). Another reason is that entrepreneurial exit has mostly been analysed (both from the theoretical and empirical perspective) from the firm-level perspective (Cefis *et al.*, 2021; Cefis *et al.*, 2020; Coad, Frankish and Storey, 2020; Coad *et al.*, 2013), including time to firm's exit (Elfenbein and Knott, 2015).

This chapter contributes to the existing literature by introducing the duration perspective to the founder's disengagement from the entrepreneurial process by exploring the role of human capital, general and specific human capital interactions, and the founder's age in the process outcome (i.e. duration of founder's exit). The chapter help in understanding how these pre-entry factors influence an entrepreneur's cognitive style (i.e. collect and process information) during the process and make efficient decisions around venture prospects (Lin *et al.*, 2022), showing how human capital enhances the application of the acquired intangible resources. Moreover how these individual factors aid post-entry assessment of a venture's viability affects founders in making the right choice, even if comes to disengaging from the process in a timely manner affects a founder's exit decision (Mathisen *et al.*, 2021).

In terms of human capital interactions, higher education particularly has a distinct advantage when combined with start-up experience, benefitting from the founder's ability to apply those ideas efficiently with their creative thinking (Arshed, Rauf and Bukhari, 2021) aided by their human capital (Lattacher *et al.*, 2021) to help the entrepreneurs refine those ideas as they progress (Canavati *et al.*, 2021) rather than quitting.

In terms of the founder's age and duration to exit, the results point to a non-linear relationship, with the older founders least likely to exit in a shorter duration. It shows that accumulated knowledge through age tends to compensate for any decline in physical strength (Bohlmann *et al.*, 2017), which keeps these founders committed to the venture creation process and not disengaging. Moreover, the lack of external employment opportunities would act as a deterrent to any disengagement decisions by older founders. Moreover, with age comes a broader perspective on to venture creation process that leads older founders to make efficient decisions in challenging market environments (Parker, 2018a), and hence less likely to disengage in a shorter period of time.

Chapter 4 (my third and final empirical study) expands the profitable outcome duration discussion to different spatial scopes of sales, contributing to the literature on born global, international new ventures, and internationalisation in general. It is important to understand how the founder's human capital factors impact the likelihood and duration of profitable venture creation by overcoming challenges around the liability of foreignness (Estrin, Korosteleva and Mickiewicz, 2020), and if local experiences provide any benefit to expanding spatial scope (Bruns *et al.*, 2017), particularly when empirical research duration of internationalisation and its impact on venture outcome is scarce (Puig, Gonzalez-Loureiro and Ghauri, 2018). I have used a nested model to overcome the construct-related challenges of studying spatial scope and performance criteria in entrepreneurship research (Pangarkar, 2008; Morais and Ferreira, 2020).

The chapter contributes to international entrepreneur literature, both for rapid (born global/international scope) and gradual (step-by-step/regional-national-international) expansion and draws a clear distinction in terms of which human capital factors are more likely to contribute to a shorter duration to a profitable launch and at which level of the spatial scope of sales. In terms of rapid internationalisation (born global, international new ventures with international scope), my study contributes to the literature that it is not necessary to have prior international start-up experience, which most international business studies have focused on in the past. Any start-up experience gives you a good practice run and exposure to start-up processes and it is the networks that founders would have built and the confidence they have gained, which make a difference. Similarly, higher educational attainment signals

professionalism and legitimacy, which is particularly helpful in dealing with international stakeholders that may evaluate founders on the face value of their qualifications and provide opportunities to expand internationally, relatively quicker than founders with lower educational attainment. This is yet another addition to the predictive power of the human capital theory from the human capital factors' transferability point of view. Particularly, it provides clarity on the human capital theory literature that suggested the more specific human capital gets, the less transferable it becomes (Sturman, Walsh and Cheramie, 2008). From the international scope, both specific (start-up experience) and general (education) are visibly transferable in attaining duration advantage in terms of a new venture creation, which I would say is a novel finding in terms of extending the human capital theory.

Prior start-up experience is vital for international scope in terms of speedier profitable new venture creation. This means that rather than having a specific experience (i.e. industry experience), a jack-of-all-trades (i.e. balanced skillset) provides founders with better chances to excel (Syme and Mueller, 2022). Prior start-up experience provides a broader and balanced skillset in terms of market and customer exposure/onboarding, wider stakeholder negotiations (banks, regulators), and multi-tasking, which contribute to a speedier and more profitable international entry. These founders also benefit more from the tactical knowledge gained from specific human capital (Øyna and Alon, 2018). Moreover, the prior start-up experience provides founders with learning by doing experience and more prepared to accept the initial sunk costs related to the international spatial scope before they hit profitability (Braunerhjelm and Halldin, 2019).

Work experience and industry experience are fruitful in regional, national and international spatial scope of sales and negatively impact the international scope. This is a key extension to the human capital theory and the 'one for all' rule does not work on different spatial scopes of sales. Prior work experience tends to only equip founders with human capital that is relevant in the domestic/national context and as foreign customer behaviour/dynamics are different than domestic customers, such experience is less likely to provide founders with a distinctive advantage in the international front (Domurath and Patzelt, 2019). In terms of industry experience, it is found to be helpful in less dynamic markets/environments (Shepherd and Patzelt, 2021b) and existing markets (Thai and Chong, 2008), hence not contributing to a shorter duration to a profitable international venture creation (born global, international new venture).

The thesis draws attention to the importance not just of the level of the founder's human capital and associated benefits but also the founder's capacity to utilise it efficiently leading to a shorter duration to a profitable venture creation (chapter 2), in different spatial scope of sales

(chapter 4) or in making a timely (efficient) decision in terms of their disengagement decision (chapter 3) to avoid personal and societal costs. Collectively these studies contribute to an overarching theme of nascent entrepreneurship and entrepreneurial process with a particular focus on duration to process' outcomes, opening up new avenues for future research in terms of studying the start-up rates in emerging markets and the contribution of their human capital to the speed of their start-up rate, at different spatial scopes of sales (i.e. regional, national and international). Moreover, exploring the possibility of combining social capital with human capital and seeing how social and cultural dynamics impact venture creation process duration and different outcomes would be an interesting future avenue.

5.3 Limitation of research

All three empirical chapters utilise two US cohorts from the harmonised PSED dataset. The PSED dataset comprises a representative sample of founders (individuals) in the process of venture creation and the dataset is designed to test and predict variation during the entrepreneurial process in terms of the transition from starting the venture creation process to either a successful venture being created or founder deciding to disengage from the entrepreneurial process (Frid *et al.*, 2016). Although the data have some information on team members, all venture-related information is being collected/sourced through one team member, the respondent (Reynolds and Curtin, 2009). However, PSED has a definite advantage over its richness in founder characteristics and venture characteristics (Hopp and Greene, 2018). The benefit of using the harmonised dataset was a better sample size over an extended period of time but one limitation of using the harmonised dataset is that it does not include social variables that I could have used as direct controls in my chapters. However, some of the variables I used are also linked to social capital constructs used by other researcher, for example, higher education has been linked to better access to social capital/network (Mishra, 2020), team size and diversity as social capital (Tasheva and Hillman, 2019; Tsai and Hsu, 2019), and born in the country birthplace (Majerski, 2019).

5.4 Future research and policy direction

This thesis mainly investigates how nascent entrepreneurs' human capital impacts entrepreneurial process duration and outcomes, using a longitudinal PSED (US cohorts) dataset. This can be expanded to multi-country studies as well as studying both the human and social capital effect on the duration to different entrepreneurial process outcomes.

Another important insight to consider in future research is to incorporate the use of social media and machine learning-based advantages that nascent founders now have access to, to

assess how that impacts the entrepreneurial process duration and outcomes. I have included industry type (hi-tech/non-hi-tech) classification and other controls (e.g. internet) but given the recent advancement in technology, I believe it would be beneficial not to only study sector type but also the use of technology by nascent founders.

An important policy implication of this research is that the research conducted about the duration of entrepreneurial outcome concerning the pre-entry human capital investment and how the human capital and opportunity cost mechanism works for founders' likelihood to launch a profitable new venture or them opting for an exit. Attempting to make all-inclusive policies from the demographic perspective (e.g. age and education) to achieve short-term and medium-term start-up growth rates would probably not work. It is not about encouraging individuals towards nascent entrepreneurship, nor is it about them entering and surviving, in business we should have smart policies that can have a targeted and higher impact rate. In my empirical studies, I have shown three key invention areas. First, focus more on older entrepreneurs, as they could fetch quicker results in terms of establishing profitable new ventures and potentially creating more jobs. From a qualification perspective, more regional and national level start-up support for individuals with lower academic qualifications would help, and for highly educated founders, supporting them with their internationalisation strategies would help grow exports, relatively quicker. These insights would aid policymakers to have targeted investment in human capital based on the demographics, industry, and spatial scope of sales perspective and more importantly to devise support mechanisms based on specific policy interventions to assess challenges and address issues in new venture creation from the founder's and duration perspective, for example during national and/or global pandemics/crises, economic and political impacts (Brexit), and supply chain disruptions (choking of key trade artery/channels). From practitioners' and entrepreneurs' points of view, this research should provide them with a pragmatic approach and realistic expectations for evaluating a new venture's viability in terms of duration to profit as well as possibilities of expanding the spatial scope of sales efficiently.

The policy implications of these findings also indicate that policymakers (e.g. government-backed start-up loan schemes) and practitioners (e.g. financial institutions, bankers, crowdfunding, seed funding providers, angel investors etc.) should not only access and design programmes based on the founder's human capital and/or business viability at the start but also consider those founders with higher human capital may also require guidance and support on keeping themselves focused and not end up getting distracted with other new ideas that come their way, them being good at spotting or creating new ideas. On the other hand, entrepreneurial ecosystem stakeholders should understand that a timely exit, driven by the founder's conscious choice and based on their efficient assessment of the viability of the idea

that they started pursuing, should be considered a positive outcome of the entrepreneurial process. Moreover, as I suggested earlier, there is huge potential in also focusing on and supporting older nascent entrepreneurs as they are likely to benefit from a diverse set of human capital and persistence given their limited options to return to waged employment, rather than them retiring, let them be a part of economic activity.

This thesis extends the possibilities of further quantitative research that examines the founder's human capital and entrepreneurial outcome rather than just the entry aspect and highlights the importance of a founder, who choose to take entrepreneurial risks and contribute to the national and global economy. This is important because entrepreneurship research has remained more tilted towards firm-level dynamics. This thesis specifically has analysed both founder's general and specific human capital factors that are both the by-product of and the contributor to the entrepreneurial ecosystem, and have advanced our understanding of moving away from the traditional approach towards the exit, where the exit is seen as a failure, and try to appreciate that nascent founders benefit from their human capital and post-entry learning much quicker than with lower human capital, and hence make an intelligent and timely choice to exit. Such founders' behaviour saves unnecessary personal and societal costs, and should also be taken as part of their learning, which regardless of if they re-enter the entrepreneurial process or choose to be an intrapreneur going forward, would benefit the wider society/economy.

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