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Role of financial, human and social capital in survival of start-ups

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Role of Financial, Human and Social Capital in Survival of Start-ups

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I hereby declare that this dissertation is my original work
and it has been written by me in its entirely.
I have duly acknowledged all the sources of information
which have been used in this dissertation.

This dissertation has also not been submitted for any degree
in any university previously.

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ABSTRACT

In new business ventures, growth in itself is often not the main intention in the beginning, but rather a mean to ensure survivability first, follow by sustainability and secure profitability. Not all small businesses survived over time and are always confronted with the liability of newness and contending externalities such as fierce competition and internal limitations like resources to survive. Only about half of newly founded start-ups survived after 5 years.

The presence or absence of resources and the critical role it plays on the effect of venture's survival, provides substantive advancement in understanding of organisational theory and management practice specifically on privately held small business. In this study, I will explore three types of resources: (i) financial capital, (ii) human capital, and (iii) social capital, and how they influence the survivability of start-ups.

Longitudinal data on 36,969 privately held new ventures confirmed the differing influences of resources on survival. Using Cox proportional hazards model with time-dependent covariates, results show that both financial capital and human capital factors positively enhances survivability, and social capital factors having mixed direction of the relationship. While results show that social resources factor like board size and ethnic diversity alone indicate a negative relationship with survivability, further study suggest that if the board size increases to sufficiently large, ethnic diversity can positively moderate the

relationship to enhance survivability, i.e. reversing the direction of the relationship.

In this study, I further examine the moderating effect of financial capital on the human and social capital relationships with venture's survival, results suggest that with the availability of slack resources, entrepreneurs are not effectively leveraging the strength of their founder's human capital and social capital when deploying or utilising the resources, potentially undertaking more risky projects or sub-optimal decisions resulting in negative impact to performance.

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1. INTRODUCTION

Small businesses vary widely in terms of their size and capacity for growth over time. Past literature has also characterised them by way of how they are organised structurally, the actions they had taken before and after the initial formation of the companies, and the differences in management styles. In Churchill and Lewis (1983) five-stage model of small business growth, based on similarities in the different phases of the development of a new business, suggests that newly incorporated start-ups will go through the early phases of 'existence' and 'survival' first before it stabilises and starts to flourish into the 'successful' stage. With the right foundation established, the business can then enter a phase of fast growth, 'take-off', before attaining its final stage of resource saturation. Therefore, for new business ventures, growth in itself is often not the main intention in the beginning, but rather a mean to ensure survivability first, follow by sustainability and secure profitability (Delmar and Wiklund, 2008).

Not all small businesses survived over time. The initial years of a small, young business are critical to its development. According to the US Bureau of Labour Statistics, the survival rate of newly founded small businesses is only about 50% after 5 years, and hazard rates vary across industries. While there are no published statistics in Singapore on small business survival rates, based on the data obtained from the Accounting and Corporate Regulatory Authority (ACRA, Company Registry) in Singapore, it depicts similar survival trends.

The strategy of a small business in its initial years is to remain alive and gain acceptance. During these phases of existence and survival, the small business goes through the critical process of imprinting. The organisational theory of imprinting was first introduced by Stinchcombe (1965). In his essay, he focused on "developing a theory of the correlation of age and structure" (1965, p.160) to comprehend the reason behind the similarities identified in organisations founded in the same period. Over the years, organisational research scholars have been building upon the work of Stinchcombe (1965), defining imprinting with three essential elements: (1) sensitive periods of transition; (2) reflecting elements of its environment, i.e. the stamping process; and (3) persistence of imprints (Marquis and Tilcsik, 2013). Entrepreneurship researchers have frequently identified the sensitive period of an organisation to be the initial formative years of new businesses, i.e. the founding period (example, Milanov and Fernhaber, 2009), and they have shown that a new venture's condition incipiently will have a lasting impact on the organisation (Boeker, 1989; Esenhardt and Schoonhoven, 1990). These studies were further extended to propose that the circumstances in which a firm was founded will have a subsequent impact on the organisation's mortality (Carroll and Hannan, 1989; Swaminathan, 1996). Hence, given the importance of the imprinting period of a new business's formation, it will be interesting to understand how various forms of resources can influence the survival of businesses in their initial years of setup.

Small Businesses are always faced with contending externalities such as fierce competition and internal limitations like resources to survive. Firms that are profitable generally are more likely to survive and succeed, given that

they can generate the required positive cashflows and accumulate slack resources (Geroski, 1995; Dosi et al., 1995; George, 2005). Management scholars have centred their studies on how the various roles of resources in an organisation can explain the strategic and behavioural traits observed. Furthermore, literature has shown that risk-taking and strategic choices of a firm can be influence by resources. Resources can act as a cushion during a period of financial distress and at the same time is a key source of assets that enable businesses to build competencies to compete. Therefore, the availability of excess resources and their effect on the firm's performance provides crucial insight into understanding the drivers behind the various phases of business life-cycle.

Many new ventures fail during the initial years after its founding. Literature has indicated that newly incorporated start-ups are often challenged with the liability of newness and the failure rates of the new venture will decrease overtime with age (Stinchcombe, 1965; Churchill and Lewis, 1983; Hannan, 1998). Financial constraints were commonly identified as the key reason for failure where new ventures are generally limited to the initial seed capital that they have and can only generate limited cash flow from the start. Prior literature has also shown with empirical evidence that financial constraints have a negative effect on the success of new ventures (Aghion et al., 2007; Saridakis et al., 2008; Hvide and Møen, 2010). Given the limited cash flow these new ventures can generate, it restricts their ability to withstand unexpected losses, even for a limited timeframe. Moreover, financial constraints also limit the new venture's ability to invest in productivity-enhancing projects, which in turn impacts the firm's success negatively.

Literature has shown that these small businesses also have difficulties accessing external resources, resulting in them often in financial constraints (Angelini and Generale, 2008). Hannan (1998) further provide a logical explanation of how the connection between age and survival of a start-up can vary non-monotonically in the presence of financial endowment. Thus, availability of financial capital plays a critical role in the survivability of small businesses.

Human capital research in entrepreneurship has also long been contended to be a central resource for the success of the firm as it increases the founder's abilities to uncover and develop business opportunities (Unger et al., 2011; Sexton and Bowman, 1985). Furthermore, literature has also suggested that human capital can also help founder to obtain other useful resources such as financial capital, for example venture capital investment, enhancing their survivability of new ventures (Gimmon and Levie, 2010). Thus, human capital of the founder assists in the build-up of new knowledge and skills to support the survival and growth of the company. Although the magnitude of human capital effect on survival and success remains uncertain, Unger et al. (2011) paper suggests that human capital remains useful in accessing the survivability of businesses when they are still young.

Human capital can comes in various forms. Spence (1974) describe human capital as personal indices, namely age, gender and ethnicity that are used as proxy for signals of human capital that influence the survivability of new venture. However, empirical findings based on personal indices to assess human capital effects on survivability and success have been mixed. Beyond personal indices, researchers have also studied the effect of experience,

knowledge and skills of human capital on the survivability and success of firms, and most findings tend to observe a positive relationship (Roberts, 1991; Colombo and Grilli, 2009). Therefore, suggest that human capital focusing on the outcome of human capital like knowledge and skills with high-task relatedness will have a stronger positive relationship with survival and success (Sapienza et al., 2004).

Another central focus of strategic management research is the Board governance of an organisation. In particular, focusing on the social capital theory presence within the board of director structure, leaderships and their effects on the performance of the firm. While there is no unanimous consensus regarding the direction of the performance relationship, Daily et al. (2002) suggest that it is likely such relationships are more pronounced in an entrepreneurial firm, i.e. small businesses. This is because unlike the bigger organisations, directors of smaller businesses are less constrained by organisational systems and structures (Esenhardt and Schoonhoven, 1990; Daily and Dalton, 1992). In line with this finding, Dalton et al. (1999) meta-analysis between the board of directors size and financial performance, has also found that this positive relationship is stronger in smaller firms. This suggests that base on the resource dependence theory perspective of larger board, it does bring a higher positive level of firm performance (Alexander et al., 1993; Goodstein et al., 1994). The key advantages of having a larger board size provides the firm with the ability to secure critical resources and provide strategic advice that helps the firm to survive and perform (Hillman and Dalziel, 2003). Furthermore, they help to reduce uncertainty by bridging any

information and skill gaps through their external connections (Hillman et al., 2000).

However, it will be challenging for small business to have a large board size at new venture formation. In order to achieve similar advantages, Aldrich and Zimmer (1986)'s network approach to entrepreneurship is another possible alternative for new venture founders. Entrepreneur networks are defined as a set of linkages among a set of individual or organisation actors (Brass, 1992). While researchers have shown that entrepreneurship network support does help the company's chance of survival and also influence the growth of small businesses (Brüderl and Preisendörfer, 1998; Donckels and Lambrecht, 1995), the impact on entrepreneurial outcomes will still depend on the nature of the network content, the network governance mechanism and the network structure (Hoang and Antoncic, 2003). Therefore, board size and it directors' memberships on other boards, as a form of social capital resources, might influence the survival of small business from founding in a multi-period longitudinal study may prove especially informative.

Given that social capital theory draws from a network structure that provides value to its members by allowing them to access to the social resources that are embedded within the network (Seibert et al., 2001; Florin et al., 2003), in Hillman et al. (2002) paper, they extract the social capital from a demographically diverse board where individuals bring different perspectives, experience, skills, divergent and views to the organisation. They found that demographic differences influence the choice that the firm takes. However, studies on board diversity, reported contradictory findings on the firm performance relationship. Some scholars have found constructive impact on

the firm's performance in the presence of gender and racial diversity in the board (Erhardt et al., 2003; Carter et al., 2003), while other studies found adverse or no connection between gender diversity and firm performance (Shrader et al., 1997; Dwyer et al., 2003). Therefore, understanding the social capital from board diversity at the founding of new ventures will allow us to gain insight on how it will influence the survivability and growth of small businesses.

Most literature on resource-performance research had largely been concentrated on publicly listed or large organisations due to the limitation of data available, with a few exceptions like George (2005) focusing on privately held firms. Therefore, multi-period longitudinal studies on how various resources influence the survival of privately held new start-ups have been limited. Furthermore, drawing from the extant research of human and social capital effects, we can advance the understanding of how in the presence of financial resources can further moderate the human and social capital effects, impacting the survivability of small, young businesses. Therefore, in my research, with the availability of multi-year data, I would like to address the following research questions:

1. *How the role of various resources (financial capital, human capital and social capital) influences the survivability of a privately held small business from founding?*
2. *How financial resources can moderate the human capital and social capital effects, impacting the survivability of a privately held small business?*

Given that young small businesses have a positive impact on the growth and development of our economy (Audretsch et al., 2006; Gries and Naudé, 2010), and also plays a key role in innovation and productivity (Aghion et al., 2009), therefore the significance of my research is threefold. Firstly, the study advances our understanding of entrepreneurship literature on how the various resources of financial capital, human capital and social capital can influence the survivability of privately held small business during their early phase of life-cycle. Furthermore, with the availability of large-sample longitudinal private data with inter-temporal changes, which have been limited in the past may prove especially informative.

This study also makes a theoretical contribution to the Board governance structure and diversity research by exploring the effects of board size, directors' memberships with other boards and board diversity on small business survivability. In fact, Daily et al. (2002) also calls for research to focus on how board composition and board size impact the firm growth and survival due to the absent in current literature. This study also further advance the current literature by examining how financial resources can potentially further moderates the effect the human and social capitals on the survivability of the business.

Lastly, given small businesses represent more than 95% of all employer firms and generate a substantial share of employment for the economy, their survivability, sustainability and subsequent success in the marketplace is important to support our economy. Thus, understanding their survivability have a significant contribution to the practice in management and banking, for example, an existing small business can introduce diversity to

their existing board structures to facilitate innovation; or allowing financial institutions like Banks to extend potential resources earlier in the life cycle of small businesses to support their growth and innovation.

2. THEORY DEVELOPMENT

Scholars in management research provide strategic and behavioural explanations on factors that influence how organisation succeed and compete in this evolving competitive environment. An area of interest within this space of research is the role of resources and how it's influences the decision that managers' take impacting the survival and performance of the firm. Resources allow managers to make strategic choices, experiments and take risk. It was deployed to build capabilities to survive, compete and succeed; and act as a cushion during financial distress. Thus, the presence or absence of resources and the critical role it plays on the effect on survival and performance, provides substantive advancement in understanding of organisational theory and management practice.

Resources can differ in types (for example, discretionary or non-discretionary) and natures (for example, human, social or financial). Companies utilise them through either leveraging, diverting or reallocating these resources to achieve their objectives. For this study, I will focus on three types of resources: *(i) financial capital, (ii) human capital, and (iii) social capital*. In addition, most studies on resources-performance relationship have largely been focusing on publicly listed or larger organisations due to the limitation of data available, with a few exceptions like George (2005) concentrating on privately held firms. In this study, I will focus on how these resources influence the survivability in the privately held small businesses during the early phases of their lifecycle.

2.1 Financial capital

Slack is a form of utilisable financial capital that companies can divert or redeploy to achieve their goals. The slack-performance relationships can be broadly explained based on three theoretical themes: the Resource-constraints literature (Starr and MacMillan, 1990; Baker and Nelson, 2005; Mosakowski, 2017), the Behavioural theory of the firm (Cyert and March, 1963; March, 1994), and the Agency theory (Jensen and Meckling, 1976). In organisational theory literature, resource-constraints argument, was built on Wernerfelt (1984)'s recourse-based view of the firm which suggests that firm with fewer resources will leverage on them more effectively and efficiently resulting in a positive performance. According to Baker and Nelson (2005) concept of bricolage, entrepreneurs in small businesses display the "making do with what is at hand" behaviour by take advantage of resources that they can get hold of to produce something new or different to support their firm's growth. This suggests that when resources are sparse, it can change the way it is being utilised and capitalize on, thus alter the behaviour by driving the managers to use them more effectively and efficiently. This theoretical argument will be especially pertinent in privately held small businesses during their imprinting phase of life-cycle.

Another major theoretical theme on the effect of slack is the study of the behavioural theory of firm, especially in the organizational decision-making process. In Cyert and March (1963) paper, they focus on the process of decision-making under uncertainty in an imperfect market, where the firm is viewed as a coalition of managers, workers, owners, customers and others, each with their own goal and objective. They claimed that slack fulfils both

the stabilizing and adaptive role by absorbing unpredictability of the environment, allowing the various groups to pursue their own objectives aiming at satisficing rather than maximising results. Researchers advanced this concept by arguing that slack helps to foster an environment for innovation where funds can be deployed towards projects with uncertain out-comes and encourage experimentation and risk taking, resulting in positive slack-innovation and slack-performance relationships (Bromiley, 1991; Greve, 2003). Furthermore, the behavioural theory of firm is also critical in explaining the connection between social capital and innovation that lead to a positive slack-innovation-performance relationship.

Scholars also suggest that the adverse slack-performance relationship can be explained by the agency theory of a firm's principal-agent conflict. Agency theory argues that the mangers of a firm will deploy excess slack to projects that were not of interest to the firm's owners, resulting in adverse slack-performance relationships (Jensen, 1986). However, in privately held small businesses, the owners are usually the same person who runs the firm, thus agency theory may not be applicable (Fama and Jensen, 1983). Therefore, in this study, I will focus on building my argument leveraging the organisational behavioural theory and resource-constraints argument to explain the slack-performance relationship in small businesses.

Financial slack is used to ensure continuity of a company's operations. It will be deployed during period of distress to sustain their business commitments and utilise during periods of growth for opportunities (Cyert and March, 1963; Levinthal and March, 1981; Meyer, 1982). Bourgeois (1981) also suggests that to overcome the burden due to threats from outside or shifts

in strategy, especially during the early phases, slack resources can be used as a cushion for the company to survive. Therefore, slack plays a central role in the survivability and performance of small businesses. Furthermore, Hannan (1998) provide a logical explanation, which suggests that with the availability of excess slack, it will change the monotonic negative relationship assumption between age and hazard rates.

Sharfman et al. (1988) suggest that deployment of slack is based on managerial discretion. High-discretion financial resources (example, cash and receivables) are unabsorbed slack and provide more flexibility for the manager to deploy. Low-discretion financial resources (example, debt and fixed assets) are absorbed slack and provides less flexibility to managers. Studies have suggested a divergence effect and provide a behavioural theory explanation on the positive high-discretion slack-performance relationship while an agency theory explanation on the negative low-discretion slack-performance relationship (Tan and Peng, 2003). However, given that agency problem is minimal or non-existence in privately held small businesses, I would expect a positively slack-performance relationship for both the high-discretion and low-discretion slack. My argument can be supported base on the behavioural theory of firm where slack resources ease the financial constraints and allow for experimenting and risk taking by managers that may deliver a positive performance outcome, thus promoting a positive slack-innovation-performance relationship.

Scholars also highlighted the importance of dynamism in how these slack resources being generated and deployed by managers, which is also of importance to the evolution of managerial behaviour and firm strategy

(Levinthal and March, 1981; Greve, 2003). While prior studies have focus on the absolute level of resources, George (2005) introduces the notion of transient slack. Transient slack is a form of excess resources that separates the resources that are available from the demands of operation and captures the transitory nature of the resources that cannot be found in absolute slack. Therefore, given the relative nature of transient slack, it allows us to understand how deployment decisions can impact the temporal changes of the firm's resources.

There seems to be incongruent in the prediction of transient slack-performance relationship using behavioural theory and resource-constraints argument. The behavioural argument suggests that both the resources available and demands are jointly considered to maintain coalitions among the various actors in the firm taking into account of environment variability. Therefore, in line with the behavioural argument, both the absolute and transient slack will allow managers' deployment of resources for experimentation and risk taking that may deliver a constructive outcome. Hence, promoting a positive slack-innovation-performance relationship. However, in the contrary, resource-constraints argue that firm's available resources are already fewer than what the operational demand requires, forces the manager to use them more efficiently and effectively to achieve their goals.

My view is that both behavioural and resource-constraints argument can co-exist and are operating at a different level of transient slack. When transient slack is positive (available resources substantially exceeds demand), behavioural theory will dominate and allow for experimentation and risk

taking by managers that possibly will bring a positive performance outcome. When transient slack is negative (resources demand substantially exceeds availability), resource-constraints argument will dominate and forces the manager to use them more efficiently and effectively to achieve their goals. When there is only marginal difference between available resources and demand, there is no motivation to experiment or bootstrap. Therefore, a curvilinear transient slack-performance relationship is expected (George, 2005).

In the following chapter, based on the financial capital literature discussed above, I will construct my hypotheses based on how the various types of financial capital, namely the imprinting resources, discretionary absolute slack and transient slack, can influence the survival of a small business.

2.2 Human Capital

Piazza-Georgi (2002, p. 463) defined human capital as "a stock of personal skills that economic agents have at their disposal" and Becker (2009) also described human capital as the skills and knowledge that was acquired through education, on the job training, and other various kind of experiences. In developing the competence-based literature stream, entrepreneurship researchers adopted this human capital theory in many of their study and further extend it to include it effects into their predictive models of venture success (for example, Davidsson and Honig, 2003; Chandler and Hanks, 1998). Scholars have distinguished human capital in different forms, including

personal indices (example, age, gender and ethnicity), human capital investments (example, educations and experiences), and outcome of human capital investments (example, task-related skills and knowledge).

Entrepreneurship literature provides a few reasons to suggest that human capital should increase venture's survivability and success. Firstly, human capital will increase the founder's capability to uncover and develop business opportunities (Shane and Venkatraman, 2000). Second, positive impact of planning and venture strategy is positively related to the human capital effect (Baum et al., 2001; Frese et al., 2007). Third, human capital can also help founder to acquire other useful resources such as financial resources (Brush et al., 2001). Lastly, it is a precondition for further advancement and acquiring new knowledge and skills (Ackerman and Humphreys, 1990; Hunter, 1986). Bringing all these together, new ventures having founder(s) with higher human capital ought to be more efficient and effective in running their business.

Scholars suggest that human capital investments like education and experience are indirect indicators of human capital, whereas the outcome of human capital investments like skills and knowledge are direct indicator of human capital (Davidsson, 2004; Unger et al., 2011). This is because the transformation of experience to knowledge and skills requires an acquisition and transfer process, as experience may not necessary lead to an increase of task-related skills and knowledge (Sonnentag, 1998; Singley and Anderson, 1989). Moreover, the positive human capital effect will be at its peak when such outcome of human capital investments like skills and knowledge are transferred and applied successfully onto the related tasks, for example, same

industry experience (Cooper et al., 1994; Gimeno et al., 1997). Therefore, task-related human capital of the same industry experience will have a stronger positive relationship with the survival of new start-ups as compared with those having non-task related human capital.

Furthermore, studies in the competence-based literature indicate that businesses are made up of distinctive competencies that are the main source of their sustainable competitive advantages in order to survive (Grant, 1996). These distinctive competencies are closely related to their founder(s) knowledge and skills (Feeser and Willard, 1990; Colombo and Grilli, 2005). For individuals to seize a business opportunity, the only option is to start a new venture based on their own idiosyncratic entrepreneurial judgement. However, in order to successfully exploit the new business opportunity, complementary context-specific skills and knowledge is required. Therefore, given that the lack of industry-specific know-how is a major determinant of the 'liability of newness', individual with greater human capital endowment especially in the same industry as the new venture are likely to have better entrepreneurial judgement and more specialised knowledge then other individuals (Colombo and Grilli, 2010). Thus, they are in a better position to make effective strategic decisions, which is critical for the survival of the new firm.

In the following chapter, based on the human capital literature discussed above, I will construct my hypotheses based on how the various types of human capital endowment, namely the general background of the founder to proxy their life experiences, management know-how embodied in

the founder and their specific industry know-how, can influence the survival of a small business.

2.3 Social Capital

In this study, I am moving away from the traditional extant literature of board governance, i.e. board independence. Given that the focus of board independence is built on the agency theory literature that arises from the parting of companies' ownership and control, in privately held small business context where the owners are usually the same person who runs the firm, agency theory will not be applicable (Fama and Jensen, 1983). Instead, I focus on the board of director's makeup and their coalition of network to provide the social capital endowment require to stimulate innovation effort.

Social capital theory was developed on the premise that a network structure exist among a set of actors which provide value to its members by allowing them to access to the social resources that are embedded within the network (Seibert et al., 2001; Florin et al., 2003). New venture survival and success can be explained using social capital theory based on three different network literature concepts. Firstly, the concept of structural holes by Burt (2004, 2009), where such brokerage facilitates the awareness of best practises to be transferred, bring relevant learning back to the network and activate remote association that synthesized elements from both groups to spark creativity and innovation. Second, the concept of weak ties by Granovetter (1973), where the information and ideas flows across network through these weak linkages, such that creativity and ideas can be initially mooted. Lastly,

based on the social resource theory of Lin (2017), where valuable resources are embedded within the network that its member can extract. However, Uzzi's (1996, 1997) suggest that an optimal network should have a mixture of both strong form embeddedness relationships and arm's length relationships.

Based on the resource dependence theory, companies can leverage on the social capital of their board of directors to secure critical resources (Goodstein et al., 1994). Therefore, having a larger board size is one way to form and reach out to environmental links. Furthermore, given that the task of increasing innovation of the firm is given to the directors on the board by allocating resources and providing ideas (Miller and Triana, 2009), I would expect that larger board size would have a positive impact on the performance of the firm. My argument can also be support by the behavioural theory of firm that suggests the intensity and creativity of innovation decision correlates with the amount of comprehensive information discussed and evaluated during the decision-making process (Cyert and March, 1963). Therefore, bigger board size can provide the social capital endowment required to stimulate this effort during the decision-making process.

Social capital provides the benefits of information, referral and timing embedded in a collection of social relationships (Burt, 2009; Coleman, 1988). Firm increase their ability to innovate when they have diverse ties (Burt, 1997; Granovetter, 1973). Hence, beside having a larger board size, its directors' network through both formal (memberships on other boards) and informal (personal) linkages are also critical in providing the firm with the ability to secure critical resources, provide strategic advice and reduce uncertainty by bridging any information and skill gaps that helps the firm to survive and

perform (Hillman and Dalziel, 2003; Hillman et al., 2000). Studies have shown that entreprenuers consistenly use networks for ideation and identify new ventures opportunities and the reliance on networks goes beyond the founding phase (Birley, 1985; Smeltzer et al., 1991; Johannisson et al., 1994). Therefore, I would further argue that directors' network through both formal and informal linkages are also important in providing the required social capital endowment for survival and performance. Moreover, the social resources embedded in such network can also help to provide signal that the venture is legitimate, which is important for new start-ups (Stuart et al., 1999; Florin et al., 2003).

Scholars have suggested that there is a positive relationship between board diversity and firm performance, specifically gender and racial diversity in the boardroom (Carter et al., 2003; Erhardt et al., 2003). Studies have argued that a heterogeneous group contain a diverse body of knowledge that allows for harvesting a wider range of ideas and information (Milliken and Vollrath, 1991), and these ideas are important to the identification, development and selection of decisions (Mintzberg et al., 1976). The behavioural theory of the firm also suggest that the more wide-ranging the information presented and considered during the decision-making process, the more innovative a group's decision will be (Cyert and March, 1963). Thus, based on behavioural theory argument, the inherent diversity of the board provides both the human and social capital (through diversity of ties) endowment required within the company to innovate and survive. In line with this, Miller and Triana (2009) uses the racial and gender diversity in the firm's board of directors as the resources that allow for a more exhaustive assessment

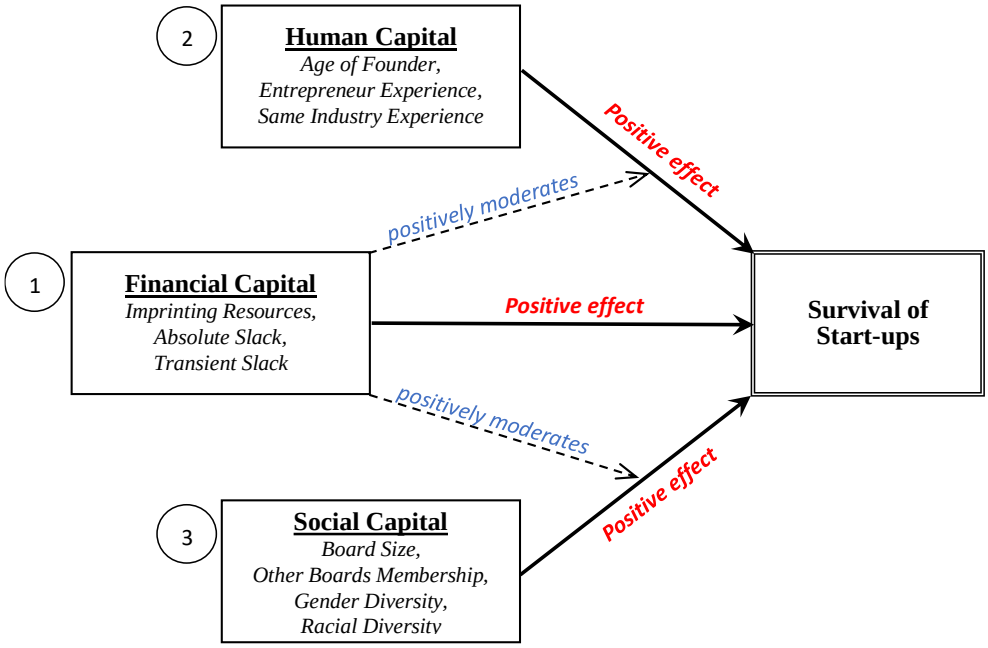
of choices, found a positive relationship between the gender and racial diversity of the firm's board with innovation.

Given that one of the critical strategies of an organisation to gain competitive advantage (Hitt et al., 1996), increase market penetration (Franko, 1989) and improve performance (Morbey, 1988) is through innovation. Therefore, in the following chapter, based on the social capital literature discussed above, I will construct my hypotheses based on how the various types of social capital endowment, namely the board size, the directors' network linkages, and both gender and racial diversity of the board, can influence the survival of a small business.

3. HYPOTHESES DEVELOPMENT

In this chapter, I will develop my conceptual hypotheses of how the various resources (financial, human and social) can have a direct influence on the survival of small businesses. Additionally, in the presence of financial resources, how human and social capital can be further moderated by it to influence the survival of small businesses. Figure 1 below depicts the conceptual model of my study.

Figure 1 – Conceptual model



3.1 Financial Capital and Survival Rates

Cyert and March (1963) first defined slack simply as "the difference between total resources and total necessary payments". For this study I will

adopt the expanded dimensions of availability, recoverability and potential (Bourgeois and Singh, 1983); further extending George (2005) studies to focus on the early phases of survivability in privately held small businesses. However, for new business ventures, since growth in itself is often not the main intention in the beginning, but rather a mean to ensure survivability first, follow by sustainability and secure profitability (Delmar and Wiklund, 2008), in my model I will focus on how the various determinants impact the survival rates of privately held small businesses, i.e. start-ups.

Studies have shown that the circumstances in which a firm was founded will have a subsequent impact on the organisation's mortality (Carroll and Hannan, 1989; Swaminathan, 1996), this include the initial founding capital that the new venture has at imprinting. The initial founding capital is the very first financial resources that the new venture can utilise to fund their operation. Thus, the availability and ability to deploy them effectively and efficiently is critical to the new venture's survivability. Therefore, together with the resource-constraints argument,

Hypothesis 1: In privately held small businesses, survival rates will increase with increasing imprinting resources.

Next, literature suggests that deployment of slack resources is based on managerial discretion. They come in the form of discretionary absolute resources. Base on the behavioural theory of firm where slack resources ease the financial constraints and allow for experimentation and risk taking by

managers that potentially will deliver a positive performance outcome, will promote a positive slack-innovation-performance relationship. Therefore,

Hypothesis 2: In privately held small businesses, survival rates will increase with increasing absolute slack.

Scholars also highlighted the importance of dynamism in the evolution of managerial behaviour and firm strategy (Levinthal and March, 1981; Greve, 2003), i.e the *transient* slack that captures the transitory nature of the resources that cannot be found in absolute slack (George, 2005). Given the seemingly incongruent explanation of the transient slack-performance relationship prediction using behavioural theory and resource-constraints argument, their co-existence suggests a curvilinear relationship at a different level of transient slack. Therefore, I hypothesize that:

Hypothesis 3: In privately held small businesses, transient slack will be related in a curvilinear manner with survival rates. Specifically, survival rates will increase with an increasing positive or negative transient slack.

3.2 Human Capital and Survival Rates

Human capital of the founders is believed to be an important component that influences the performance of the new venture (Bruderl et al., 1992; Cooper et al., 1994; Dimov and Shepherd, 2005). Literatures categorised human capital in different forms, including general human capital

of personal indices, human capital investments like management know-how and outcome of human capital investments like specific industry know-how.

The first level of initial resource to a new venture is the availability of founder's general human capital. In my study, age is selected to reflect the founder general background, which are not specific to any human capital investments or for a particular line of business. Age serve as a proxy for life experience and ability to access to networks and other resources that potentially influence the survivability of a new start-up. Therefore, I hypothesize that:

Hypothesis 4: In privately held small businesses, survival rates will increase with increasing age of founder.

Next is the founder's human capital investment of management know-how earned from experience, which is an important resource of a new venture. Knowing how to run a business by observing, studying and making business decisions over time, are important knowledge that a new venture requires to increase their chance of survival. Therefore, I hypothesize that:

Hypothesis 5: In privately held small businesses, survival rates will increase with increasing years of founder's entrepreneurial experience.

Lastly, founder's specific industry know-how is the outcome of human capital investment where the acquired experience is transform to distinctive capabilities specific to the industry or line of business of the new venture.

Specific industry know-how brings direct relevant knowledge, skills, experiences, and suppliers and buyers relationships to the new venture that help to reduce the liability of newness. Therefore, I hypothesize that:

Hypothesis 6: In privately held small businesses whose founders have industry specific expertise is more likely to survive than ventures whose founders do not.

3.3 Social Capital and Survival Rates

Based on the behavioural theory of firm, the intensity and creativity of innovation decision correlates with the amount of comprehensive information discussed and evaluated during the decision-making process (Cyert and March, 1963). Firm increase their ability to innovate when they have diverse ties (Burt, 1997; Granovetter, 1973). Therefore, social capital provides the benefits of information, referral and timing embedded within the collection of social relationships (Burt, 2009; Coleman, 1988). Hence, given that social capital resource is required to stimulate the wider range of ideas and information discussed during the decision-making process, using board size and directors' memberships with other boards as measures of social capital resources,

Hypothesis 7: In privately held small businesses, survival rates will increase with an increasing number of directors on the board.

Hypothesis 8: In privately held small businesses, survival rates will increase with an increasing number of directors' memberships with other boards.

As heterogeneous group contains a diverse body of knowledge that aid in generating a wider scope of ideas and information (Milliken and Vollrath, 1991), and these ideas are important to the identification, development and selection of decisions (Mintzberg et al., 1976). Thus, board diversity provides both the human and social capital resource of a heterogeneous group required in the decision-making process. In line with this, using board demographic diversities as measures of social capital resources,

Hypothesis 9: In privately held small businesses, survival rates will increase with gender diversity in the board.

Hypothesis 10: In privately held small businesses, survival rates will increase with increasing racial diversity in the board.

3.4 Moderating Effect of Financial Capital and Survival Rates

The task of increasing innovation of the firm is given to the directors on the board by allocating resources and providing ideas (Miller and Triana, 2009). Both human and social capital endowment of the board, provides for a wider range of ideas and information discussed during the decision-making process, and allows for a more exhaustive assessment of choices and ideas generated for identification, development and selection of decisions.

Furthermore, based on the behavioural theory of firm and resource-constraint literature, firm's decision-making process will also be influenced by the level of financial capital available and impact on how they deploy slack resources, experiment and taking risk. Thus, with the availability of financial slack, the board can be more liberal and creative in their decision-making process. This will result in more creative ideation, increasing innovation and improvement to the performance of the new venture. Therefore, with financial capital as moderator, I hypothesize that:

Hypothesis 11: Financial slack positively moderates the relationship between human capital and survival. Such that, the impact of human capital on survival rates will be further improve in firms with higher financial slack than in firms with lower financial slack.

Hypothesis 12: Financial slack positively moderates the relationship between social capital and survival. Such that, the impact of social capital on survival rates will be further improve in firms with higher financial slack than in firms with lower financial slack.

4. DATA AND METHODS

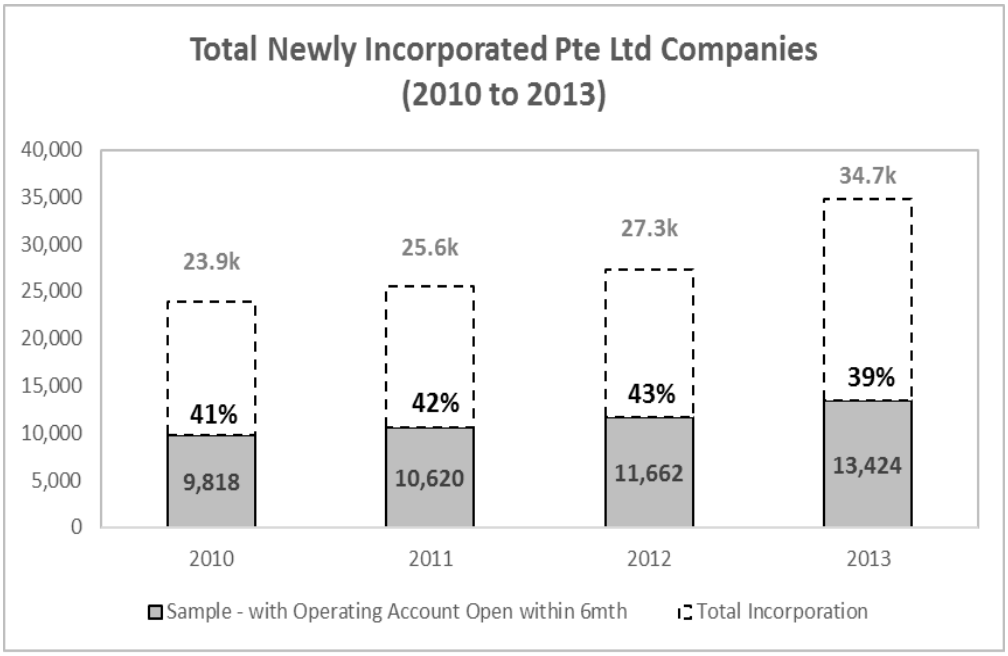
4.1 Data

Singapore newly incorporated Private Limited (Pte Ltd) small businesses from year 2010 to 2013 across all industries with an active primary operating bank account opened within 6 months of incorporation are sampled in this study. This is to ensure that operating activities were observed close enough to the incorporation date and reduce the chances that it is a subsequent bank account. Furthermore, sole proprietorship setup is not considered in this study because they generally do not have any legal distinction between the owner and the business entity and there is no requirement to set up a board structure. In addition, the founder's level of seriousness and commitment to the business is usually low given the lesser regulatory requirements by the Accounting and Corporate Regulatory Authority (ACRA, Company Registry) in Singapore. Moreover, in Singapore, the incorporation data of sole proprietorship is also skewed by private drivers (for example, Uber's driver) who are required to set up a sole proprietorship before they can drive for the company, i.e. businesses with no intrinsic business plans. Therefore, given that Delmar and Shane (2004) highlighted the importance of legitimating the business for any new ventures, the focus of this study will be on Private Limited (Pte Ltd) small businesses only.

The data in this study are drawn from the Singapore ACRA (Company Registry) and complement with the companies' banking transaction data. To ensure that the analysis is representative of the Singapore market, the sample

collected must be a significant representation of the total population across the period. Thus, a total of 45,524 new Pte Ltd small businesses incorporated between year 2010 and 2013 were initially identified for my study. This represents a substantial proportion between 39% to 43% of each yearly's cohort (see Figure 2).

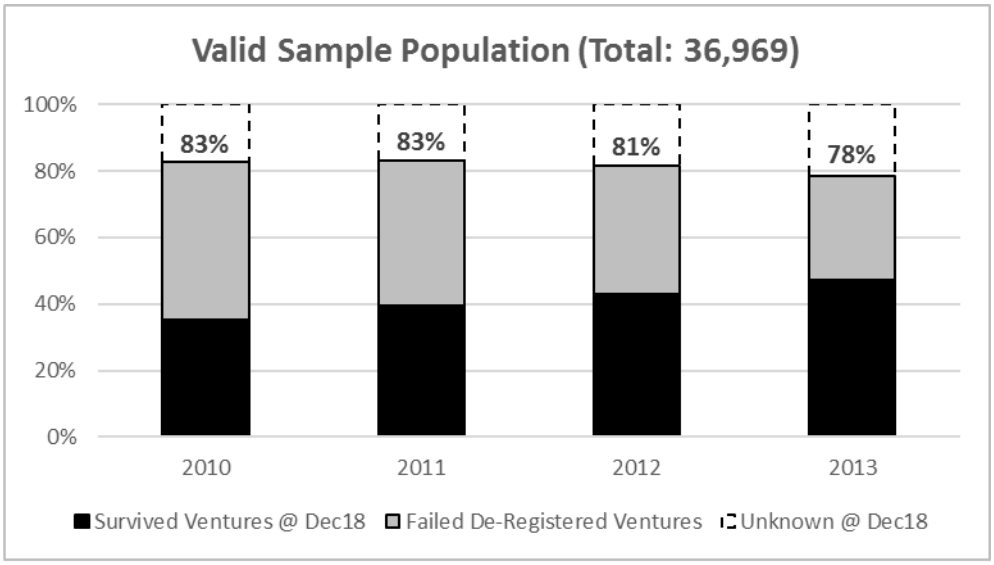
Figure 2 – Total Newly Incorporated Pte Ltd Companies and initial sample size



Source: Company Registry - ACRA, and Bank.

However, during the observation window from incorporation to December 2018, there were a group of small businesses within the initial sample selected (approximately 20%), which terminated the relationship with the bank but did not de-registered from ACRA, resulting in not able to track the performance of these companies. Therefore, these companies will be classified as 'indeterminant' and excluded from this study. Hence, the final sample population of 36,969 Pte Ltd companies will be used for this study (see Figure 3).

Figure 3 – Valid Sample Population (Total: 36,969 Pte Ltd companies)



Source: Company Registry - ACRA.

To ensure that there is no biasness in the sample selected, further checks to ensure that the compositions should mimic the overall newly incorporated Pte Ltd companies were also performed. Thus, Figure 4 and 5 demonstrates that the distribution of the sample by Industries type and Paid-Up Capital (proxy of initial companies' sizes) mirrors the entire population of newly incorporated Pte Ltd companies from 2010 to 2013.

Figure 4 – Total Newly Incorporated Pte Ltd Companies Industries Distribution

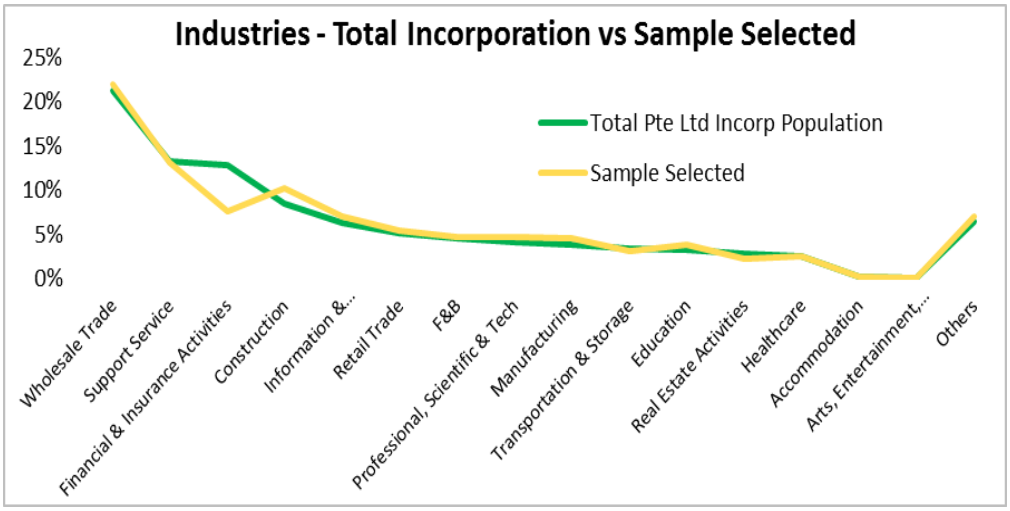
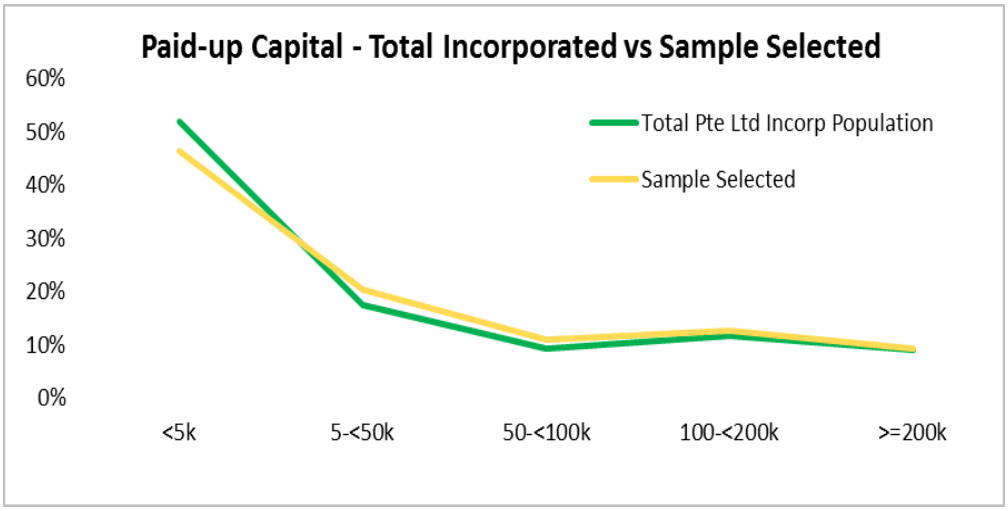


Figure 5 – Total Newly Incorporated Pte Ltd Companies' Paid-Up Capital Distribution



Anecdotally small businesses only maintain one operating account in their initial years of incorporation as their focus is largely on acquiring Sales. While, I have control for this by ensuring the sample selected were based on operating account (i.e. Current Account) with the Bank was opened within 6 months of incorporation, I further ensure that during the observation window there is no intra-company transfer of funds to the same legal entity via electronic modes[1] to another potential account opened with another Bank. The results support the proposition that during the initial years of formation, small businesses only have one operating account with a sole Bank.

In this study, the observation window selected is the first five to eight years of incorporation. This allows us to understand the effect of various resources (i.e. *financial capital, social capital and human capital*) that may be accumulated and deployed over time in helping small businesses to survive during the early years. Yearly performance data were tracked over the

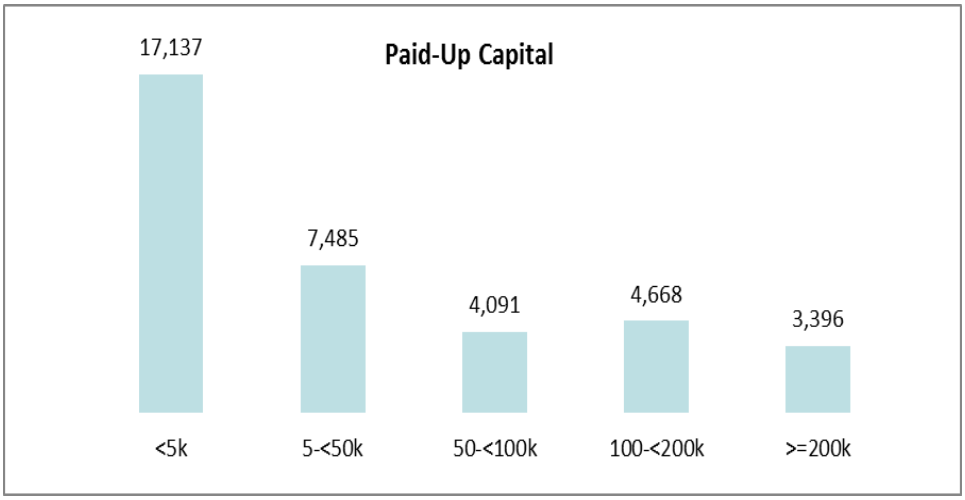
[1] Based on electronic transaction types with counterparty information include Telegraphic Transfer (TT), MAS Electronic Payment System (MEPS), GIRO, Fast And Secure Transfers (FAST), Internal Funds Transfer (IFT).

observation window or till they de-registered from ACRA (i.e. failed) before the end of the observation window. Data collected includes firmographics, directors' demographic and their memberships with other boards, bank's transactional information, geographic locations of businesses and macroeconomic indicators during the observation period. The summary of the data considered in the study is shown below based on the sample collected.

i. Financial Capital – Paid-Up Capital

Paid-up capital is obtained from ACRA at point of incorporating the new venture. Figure 6 shows that 46% (i.e. 17,137) of the new incorporation are with less than $5,000 paid-up capital, as compared to 22% (i.e. 8,064) having more than $100,000 paid-up capital.

Figure 6 – Paid-Up Capital



ii. Financial Capital – Average Bank Balances

Average Bank Balances is obtained from the Bank's transactions where the start-ups maintain their operating account. The median average balance per company stood at $21,000 as compared to $122,430 average balance

per company. 25th percentile of the observations register at $5,610 net cashflow while 75th percentage register at $73,070 net cashflow.

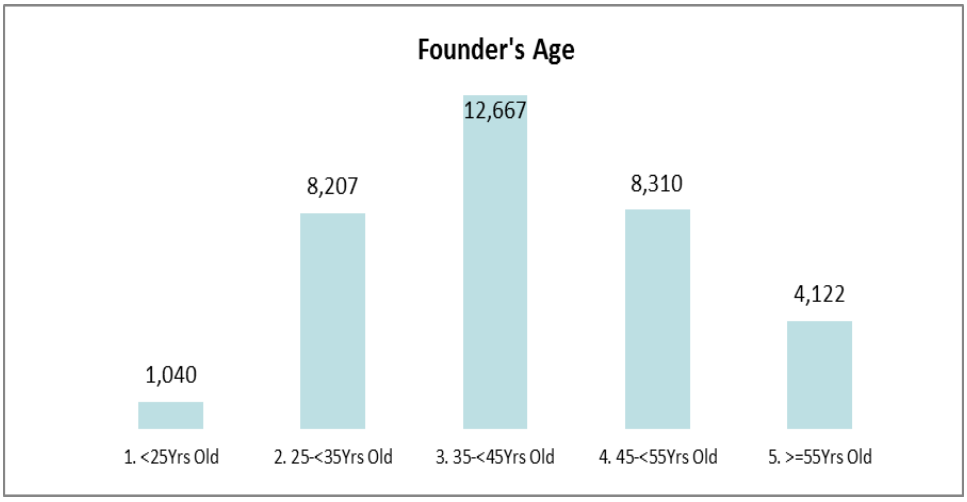
iii. Financial Capital – Net Cashflow

Net Cashflow is derived from the collections (debits) and receivables (credits) of the Bank's transactions, i.e. the net difference between the total credits and total debits. The median net cashflow per company stood at positive $641.90 as compared to positive $15,603 average balance per company. 25th percentile of the observations register a negative $4,464 net cashflow while 75th percentage register a positive $19,412 net cashflow.

iv. Human Capital – Founder's Age

For this study, founder's is defined as the largest shareholder of the new start-up. The founder's age is obtained from ACRA record or the Bank. Figure 7 shows that 25% (i.e. 9,247) of the new incorporation are with founder's age less than 35 years old, compare with 11% (i.e. 4,122) age exceeding 55 years old.

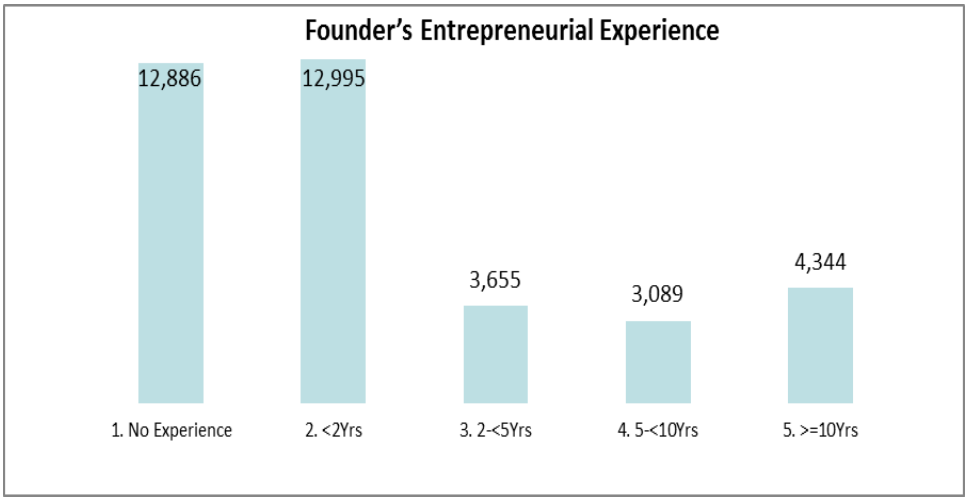
Figure 7 – Founder's Age



v. Human Capital – Founder's Entrepreneurial Experience

The founder's entrepreneurial experience is derived based on historical ACRA records and the record will be updated wherever there is a change in ACRA register. Figure 8 shows that 35% (i.e. 12,886) of founders have no entrepreneurial experience, compare with 12% (i.e. 4,344) of founders having 10 years or more entrepreneurial experience.

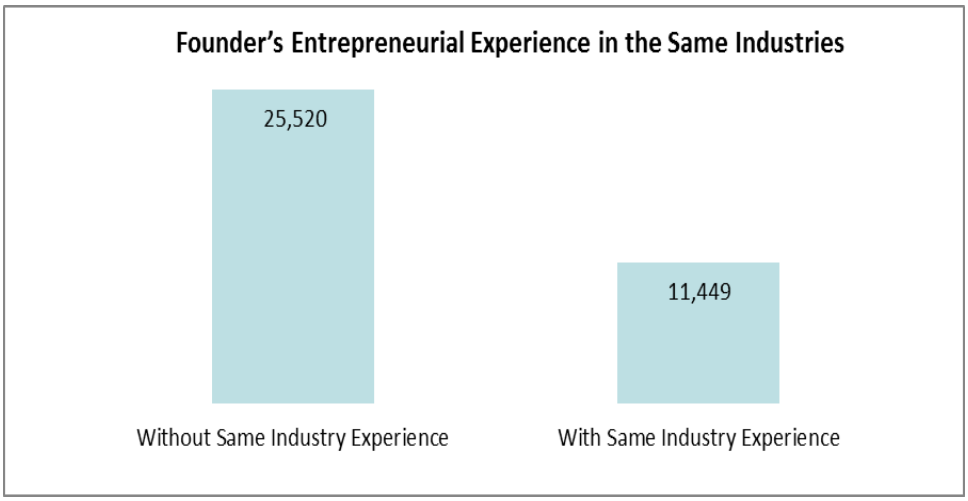
Figure 8 – Founder's Entrepreneurial Experience



vi. Human Capital – Founder's Entrepreneurial Experience in the Same Industries

Similarly, the founder's entrepreneurial experience in the same industries is derived based on historical ACRA records by matching founder's new ventures with the same 2-digit industries SSIC (Singapore Standard Industrial Classification). The record will also be updated wherever there is a change in ACRA register. This allows us capture the founder's entrepreneurial experience in the same industries for their subsequent new ventures within the observation window. Figure 9 shows that 31% of founders have entrepreneurial experience in the same industries.

Figure 9 – Founder's Entrepreneurial Experience in the Same Industries

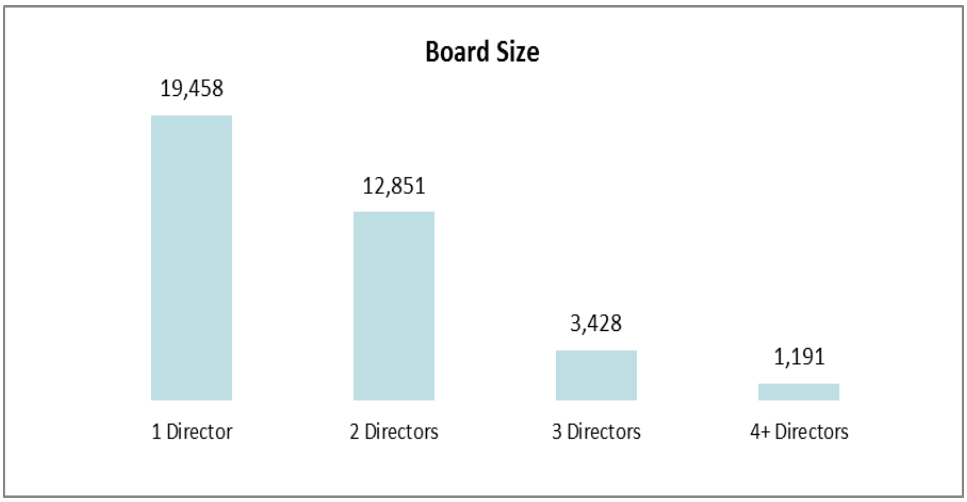


vii. Social Capital – Board Size

Board size is obtained from the historical ACRA records and the record will be updated wherever there is a change in ACRA register. This allows us to observe the change in board size over time. Figure 10 shows that 51% (i.e. 19,458) of the new incorporation are with single board member

only, compare with 12% (i.e. 4,619) having 3 or more directors on the board.

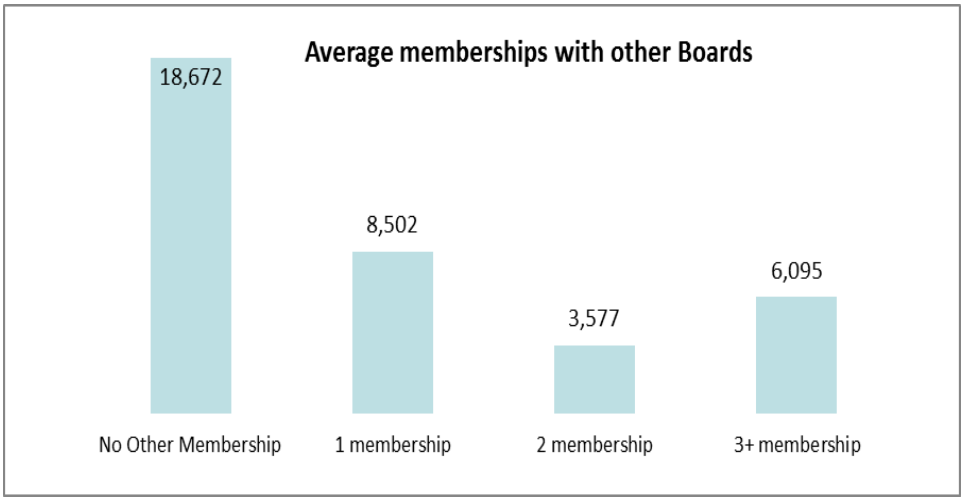
Figure 10 – Board Size



viii. Social Capital – Average memberships with other Boards

Directors' average memberships with other Boards are obtained from the historical ACRA records by matching the common directors across companies, and the record will be updated wherever there is a change in ACRA register. This allows us to observe the change of memberships with other Boards over time. Figure 11 shows that 51% (i.e. 18,672) of the board does not have any membership in other board, compare with 16% (i.e. 6.095) having 3 or more average memberships with other Boards.

Figure 11 – Average memberships with other Boards



ix. Social Capital – Board Diversity

Board Diversity is obtained from the gender and ethnic recorded with the Bank. In Singapore, there are four categories of ethnic group, namely Chinese, Malay, Indian and Other. Figure 12 shows that 21% (i.e. 7,860) of the new incorporation are with mixed gender board, while figure 13 shows that 11% (i.e. 4,176) of the new incorporation are with mixed ethnic board.

Figure 12 – Gender Diversity

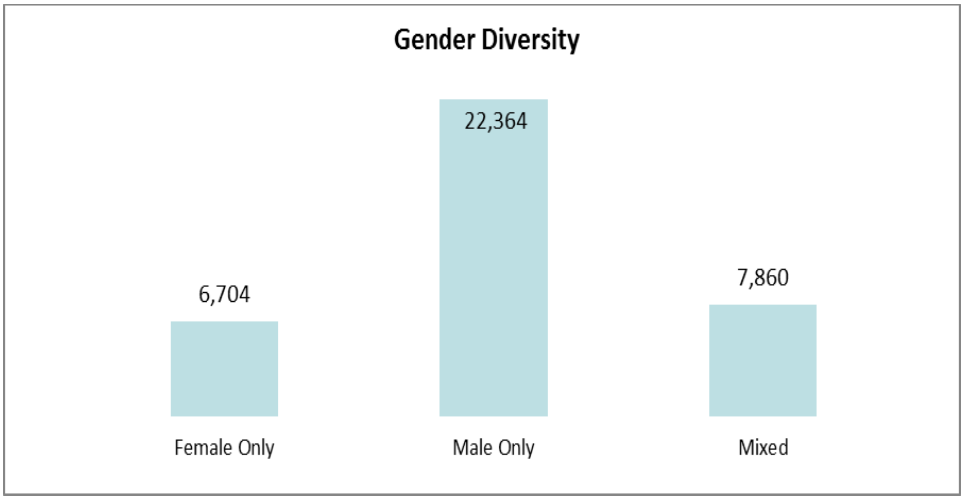
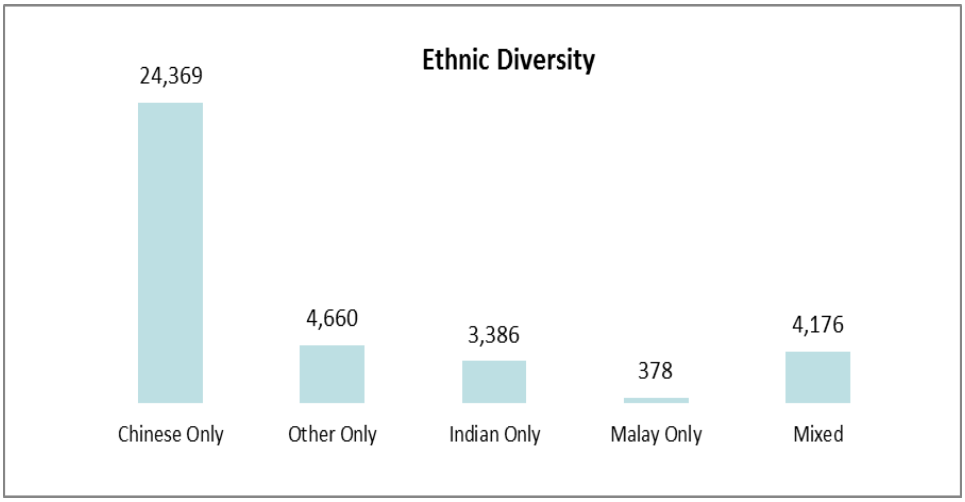


Figure 13 – Ethnic Diversity



x. Control variables

Location of the small businesses is used as a control variable in the model based on registered address postal code from ACRA. This is to account for the potential constructive effects like innovation clusters, industries' intensity, and access to the human capital that supports the ecosystem in each location, helping businesses to survive.

Similarly, 2-digit Singapore Standard Industrial Classification (SSIC) grouping from ACRA record is also used to control for competitions within the same industries where possible difference between 'high-barrier to entry' (for example, Manufacturing and Healthcare) versus 'low-barrier to entry' (for example, Retail) industries' survival rates.

Furthermore, to account for the effect that was due to the change in the macro-economic environment during the observation window, I have considered the following macro-economic indicators in my model: (i) Gross Domestic Product (GDP), (ii) Unemployment rates, (iii) Composite

Leading Index, (iv) Consumer Price Index (CPI), and (v) Manufacturing PMI. Lastly, as a control to the imprinting condition effect of a new formation, the number of new incorporation was also added into the model to measure the effect of new entrants' competitive landscape.

4.2 Methodology

4.2.1 Cox proportional hazards model with time-dependent covariates

For survival analysis, a commonly used model with right-censored time-to-event data is the Cox proportional hazards model (Cox, 1972). Given that the trigger for survival analysis is the *failure* event, "right-censored" allows for a sub-population of the observations that did not experience the trigger event during the time of analysis conducted, i.e. the survived companies. The Cox model can allow us to simultaneously evaluate the effects of multiple variables (i.e. covariates) influencing the hazard rate of an event happening (i.e. in our study, the failure of business). Therefore, the Cox model can be expressed by the following *hazard function h(t| X)* to estimate the risk of failure at time t:

$$h(t|\ X) = h_0(t) \times exp\{\beta X\} \quad (1)$$

where

- t represents the failure time of interest
- X is the possible sets of covariates ($x_1, x_2, x_3, \ldots, x_n$)
- $h_0(t)$ is an unspecified baseline hazard function with all the covariates equal to zero
- β is the corresponding coefficients of the covariates measuring its impact to the risk of failure

Given that the traditional Cox proportional hazards model was designed to evaluate using only fixed non-time-dependent covariates (X) and

limit the analysis of time varying variables in this study, I will incorporate Fisher and Lin (1999) time-dependent covariates into our model. Therefore, based on Fisher and Lin (1999), I let Y be a set of possible time-dependent covariates (y_1, y_2, y_3, ..., y_n) with a function of time. Hence, $Y(t)$ denotes the value of Y at time t, and $Y(t) = \{Y(i) : 0 \leq i \leq t\}$ denotes the historical values of Y up to time t. Thus, the Cox model conditional-hazard function $h\{t| Y(t)\}$ can be generalised to allow time-dependent covariates as follow:

$$h(t| Y(t)) = h_0(t) \text{ x } exp\{\beta Y(t)\} \quad (2)$$

Given this conditional-hazard function, the effect of one unit increases in Y on the risk of failure at time t, can be measured by the *hazard ratio (HR)* as follows:

$$HR: exp(\beta) = h(t| Y(t) = y(t)_n+1, Z) / h(t| Y(t) = y(t)_n, Z) \quad (3)$$

where Z is the other common covariate in the equation.

Hence, if the *hazard ratio (HR)* is less than 1 (i.e. with $\beta < 0$), would mean that as the value of the nth covariate increases, it will reduce the risk of failure. Thus, consider as a positive survival factor. If *HR* is more than 1 (i.e. with $\beta > 0$), would mean that as the value of the nth covariate increases; it will increase the risk of failure. Therefore, in this case, it will be a negative survival factor. Lastly, if the specific covariate has no effect on the risk of failure, *HR* will be equals to 1 (i.e. with $\beta = 0$).

4.2.2 Diversity measures – Herfindahl–Hirschman Index & Blau's Index

For measurement of gender diversity within the Board, I will construct a Herfindahl–Hirschman Index (HHI) to measure gender concentration within the board. HHI is defined as:

$$HHI = \sum s_i^2$$

where 's' is the proportion of members in the group that are in the 'ith' category, in this case the number of board members that belong to a certain gender group (i.e. 'Male' or 'Female'). If the HHI is 1, it means all the board members belong to the same gender group, i.e. no diversity. Thus, the higher the index the less gender diversified the board is.

For measurement of ethnic diversity within the Board, I will construct a Blau's Index to measure ethnic diversity. Blau's Index is defined as:

$$Blau's\ Index = 1 - \sum p_k^2$$

where 'p' is the proportion of members in the group that are in the 'kth' category, in this case the number of board members that belong to a certain ethnic group (i.e. 'Chinese', 'Malay', 'Indian', or 'Other'). If the Blau's Index is 0, it means all the board members belong to the same ethnic group, i.e. no diversity. Thus, the higher the index the more ethnic diversified the board is.

5. PRELIMINARY ANALYSIS, DESCRIPTIVE STATISTICS & CORRELATIONS

The survival rates for this group of newly incorporated companies across the various cohorts from 2010 to 2013 depicts a similar consistent pattern (refer Figure 14 and 15), with a blended average 51% of the companies survived as of December 2018 (i.e. a 49% average failure rate), i.e. 17,994 out of the 36,969 new Pte Ltd companies de-registered from ACRA (Company Registry) over the period 2010 to 2018. Based on the sample data by cohorts, the survival rate will generally reduce further from 60% when they are 5 years of incorporation (based on the 2013 cohort) to 42% by the time it reaches 8 years of incorporation (based on the 2010 cohort). The slight difference between the 2010 cohort versus 2013 cohort survival rates at 5 years point-of-incorporation was due to the timing of de-registration where some failed companies will only de-register during the next annual ACRA renewal cycle.

Figure 14 – Survival Rates by Cohorts by Calendar Years

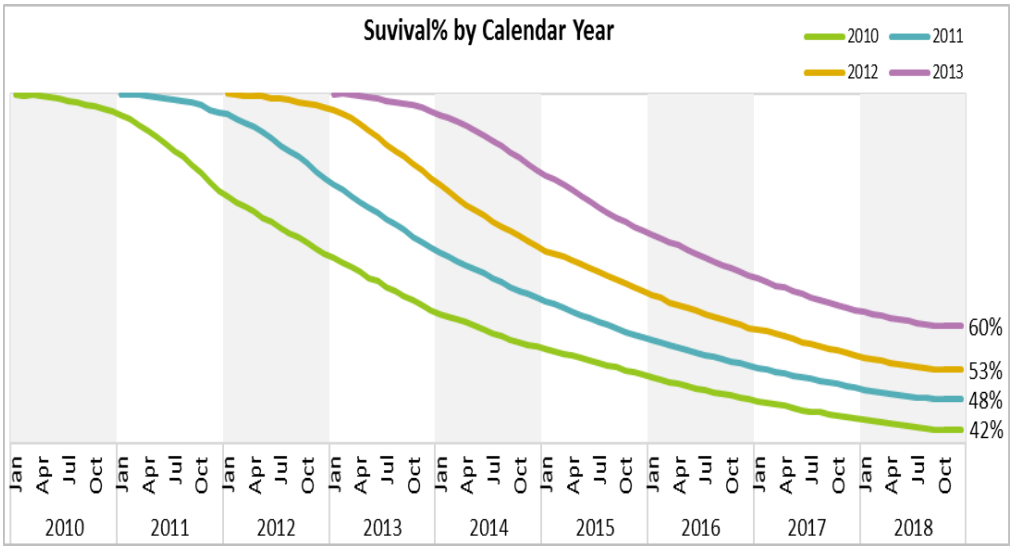
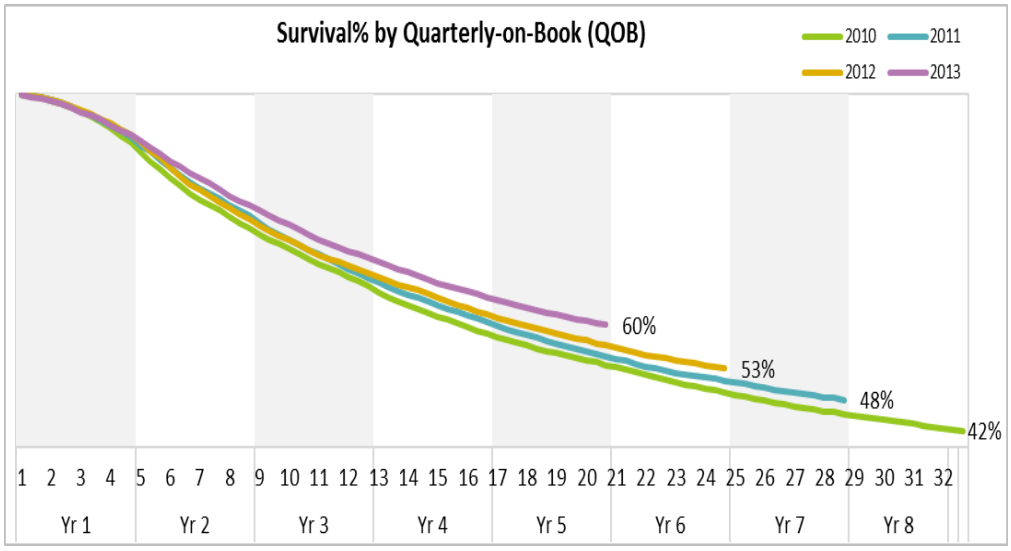
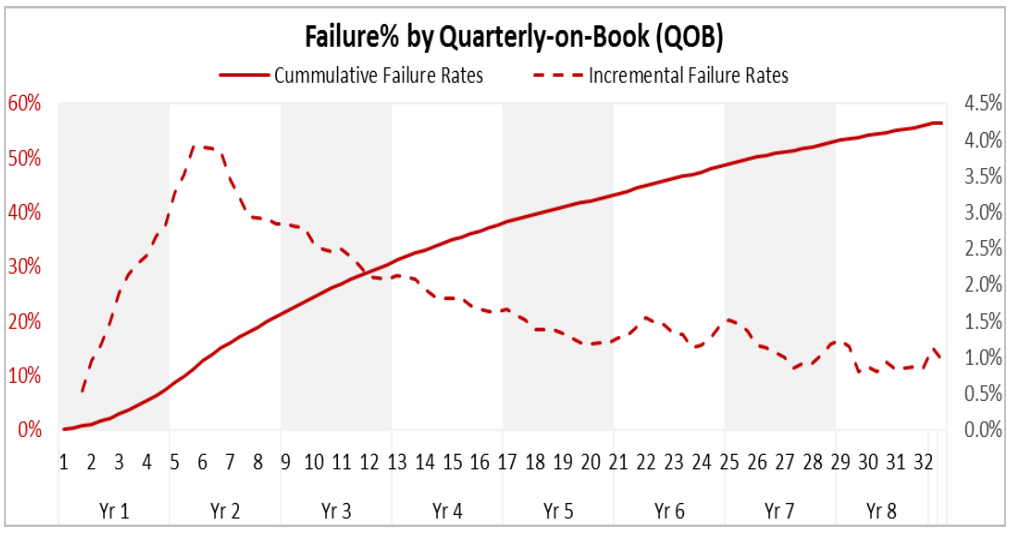


Figure 15 – Survival Rates by Cohorts by Quarterly-on-Book (QOB)



From a failure rate perspective (i.e. 1 – survival rates), Figure 16 shows that incremental hazard rates portray a non-monotonic connection between the hazard rate and the age of the new venture, which peak during the first two years, followed by a steady declining trend subsequently signifying an inverted U-shape liability of adolescence (Bruderl and Schussler, 1990; Hannan, 1998). Thus, with the high hazard rate (i.e. low survival rates) and non-monotonic relationship, it is central to understand the drivers that impact the risk of failure in small businesses during the initial years.

Figure 16 – Newly Incorporated Pte Ltd Companies Failure Rates



There are different types of resources covered in this study that will potentially influence the survival of small businesses, namely *(1) Financial Capital; (2) Human Capital; and (3) Social Capital*. Financial capitals are assets in monetary terms that allow entrepreneurs to buy what they need to provide goods and services, and in return receive monetary cashflow for survival and growth. Human capitals are generally intangible assets that the entrepreneurs acquire such as experience, skills and know-how. Lastly, Social capitals are an embedded network of social or physical relationships among different actors that facilitate the exchange of information or assets for survival.

5.1 Financial Capital and Survival Rates

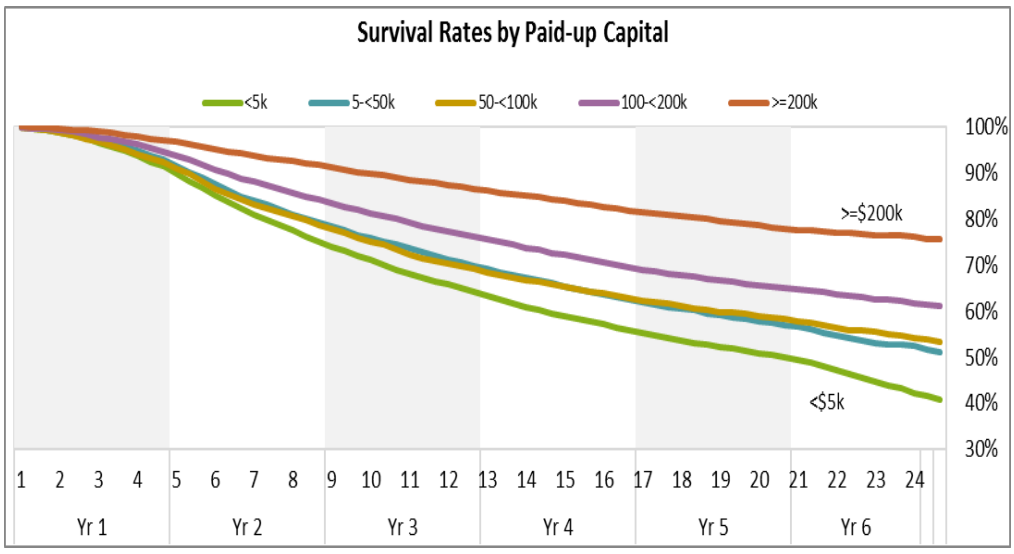
In Singapore, according to ACRA (Company Registry) only businesses with sales revenue exceeding SGD 10 million are compel to file an audit financial statement yearly. Hence, the financial data of privately held small businesses are generally not available in their early years of formation. Therefore, in this study, I have leverage on banking transaction data to proxy the financial variables used in the model. The preliminary description of the variables considered in the study against the company's survival rates over the observation window is shown below.

5.1.1 Paid-Up Capital (as imprinting resources available for the company at the start)

Company's initial paid-up capital is the first funding that they have assessed to when they are newly founded. Thus, defining 'Paid-Up Capital' as

the initial endowment of *imprinting resources*. Figure 17 suggests that the higher the initial paid-up capital, the less likely the company will fail, suggesting that paid-up capital is positively correlated to the survivability of the firm.

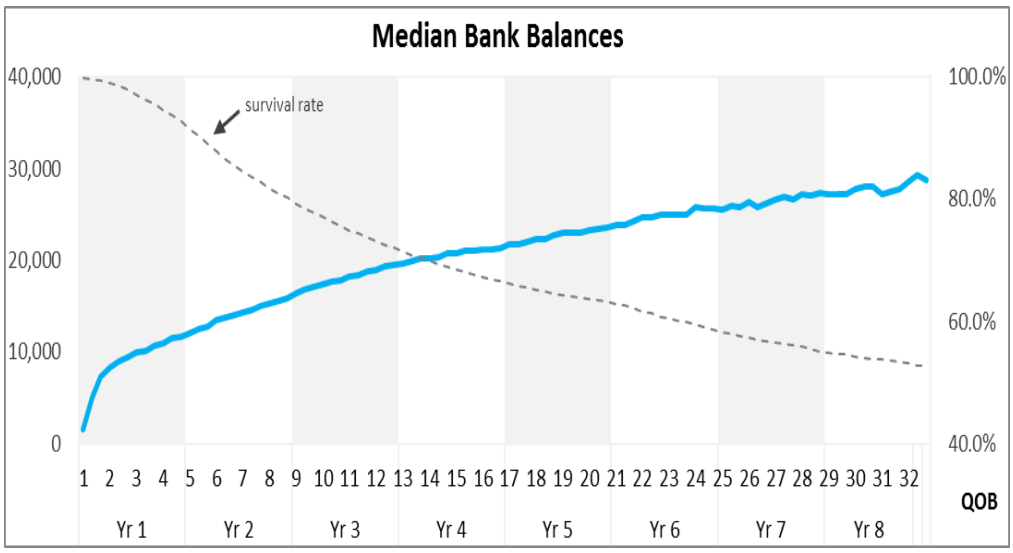
Figure 17 – Paid-Up Capital vs Survival Rates



5.1.2 Average Bank Balances (as discretionary absolute slack available for the company)

For operational requirements, organisation will depend on the cash balances they have in the bank account to draw upon for deployment, i.e. 'Average Bank Balances' is defined as the unabsorbed *discretionary absolute slack* accessible by the manger to deploy. Given the survival bias, Figure 18 also demonstrations that the median companies' average bank balances rise overtime on the surviving companies, implying a negative relationship to failure rates too.

Figure 18 – Median Average Bank Balances vs Survival Rates



5.1.3 Net Cashflow (as transient slack available for the company)

Net Cashflow is defined as the dynamic *transient slack* that organisation needs in order to sustain the continuing business requirement, i.e. the recoverable dimension of financial resources. This allows the company to meet on-going temporal demands required. The Net Cashflow is derived using the net difference between the annualised total Credits Turnover (i.e. collections/receivables into the bank account) and the total Debits Turnover (i.e. payments out of the bank account). Figure 19 potentially suggests a no-relationship between Net Cashflow and survival rates. However, interestingly given survival bias, Figure 20 shows that companies experiencing either a substantial high negative or high positive net cashflow will experience a lower risk of failure in the next 24 months. Hence, indicate a curvilinear relationship exist between the transient slack and survival rates (George, 2005).

Figure 19 – Net Cashflow vs Survival Rates

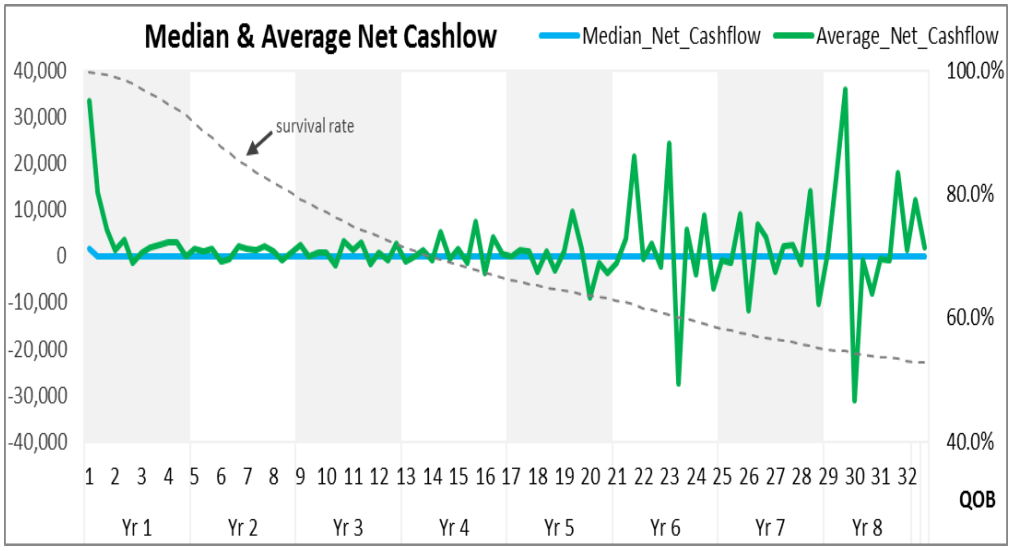
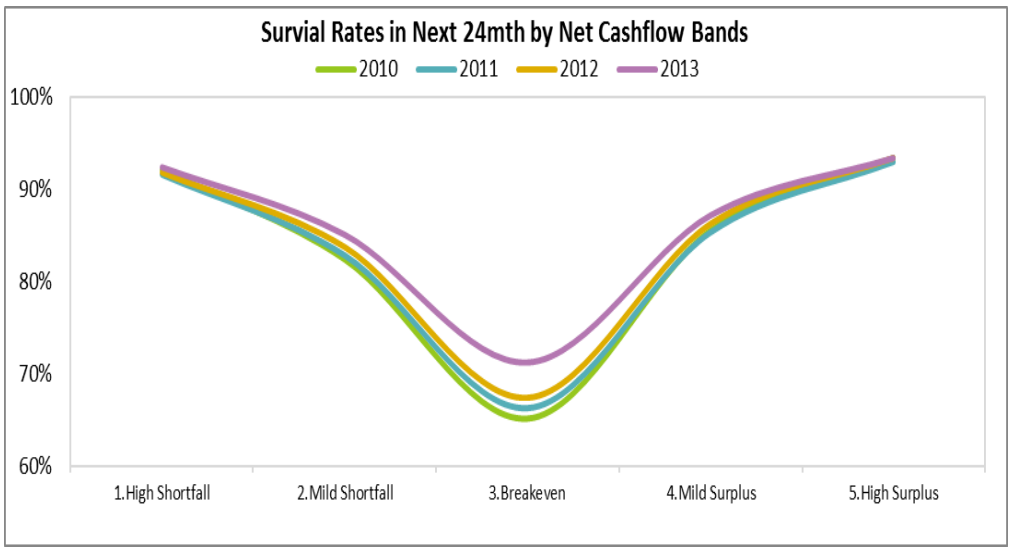


Figure 20 – Curvilinear relationship of Net Cashflow vs Survival Rates in next 24-months



5.2 Human Capital and Survival Rates

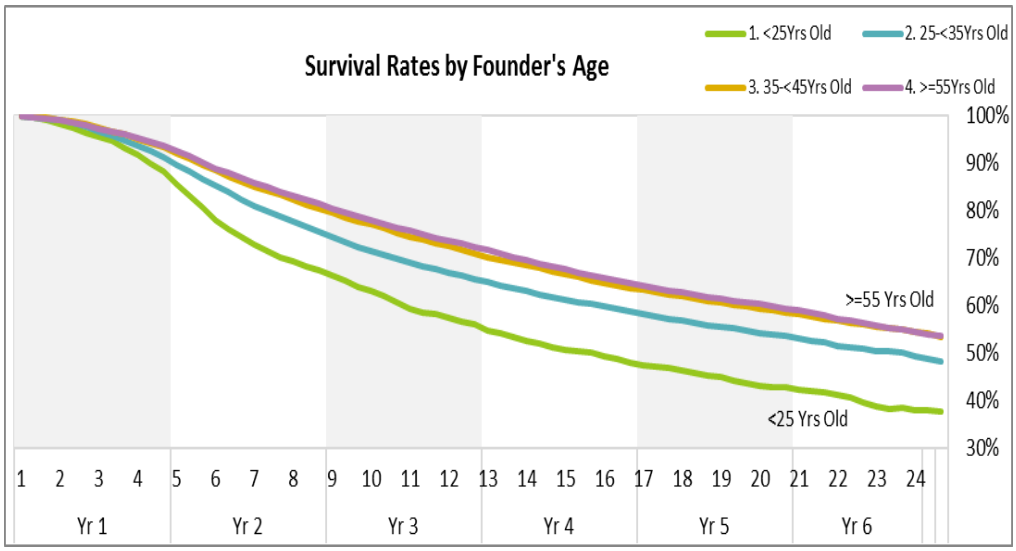
Human Capital draws upon the intangible assets of the entrepreneurs in the running of businesses. In this study, I will draw the human capital elements from the general, management know-how and specific industry know-how human capital endowments of the founder. Preliminary description

of the human capital variables considered in the model against the company's survival rates over the observation window is shown below.

5.2.1 Founder's Age (as general human capital)

Age reflect the founder's general background and served as a proxy for life experience and ability to access to networks and other resources that potentially influence the survivability of a new start-up. Figure 21 suggest that there is a positive relationship between founder's age and survivability.

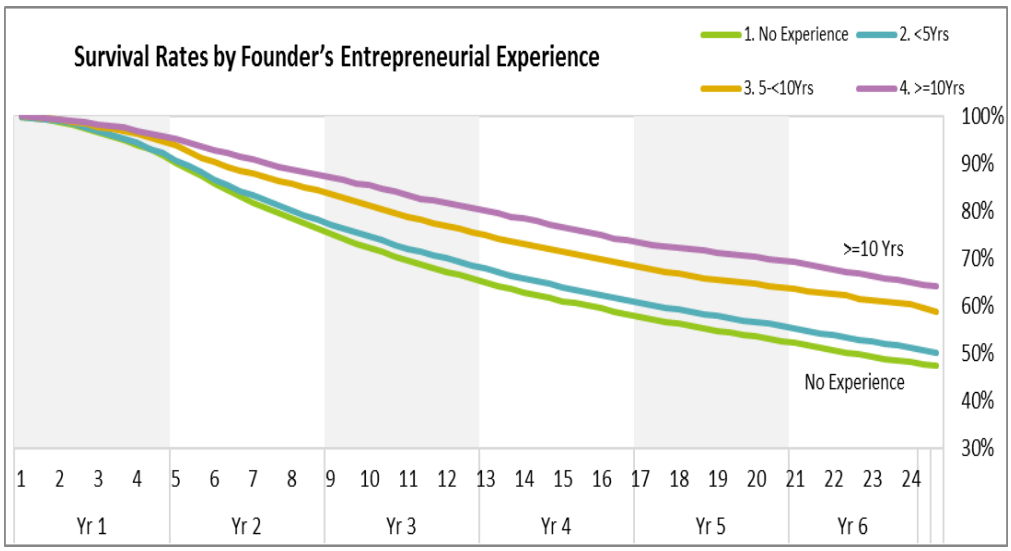
Figure 21 – Founder's Age vs Survival Rates



5.2.2 Founder's Entrepreneurial Experience (as management know-how)

Literature on human capital has shown that founder's human capital investment of management know-how earned from experience is one crucial resources of a new venture. Figure 22 suggest that founder's entrepreneurial experience does increase the chance of survival.

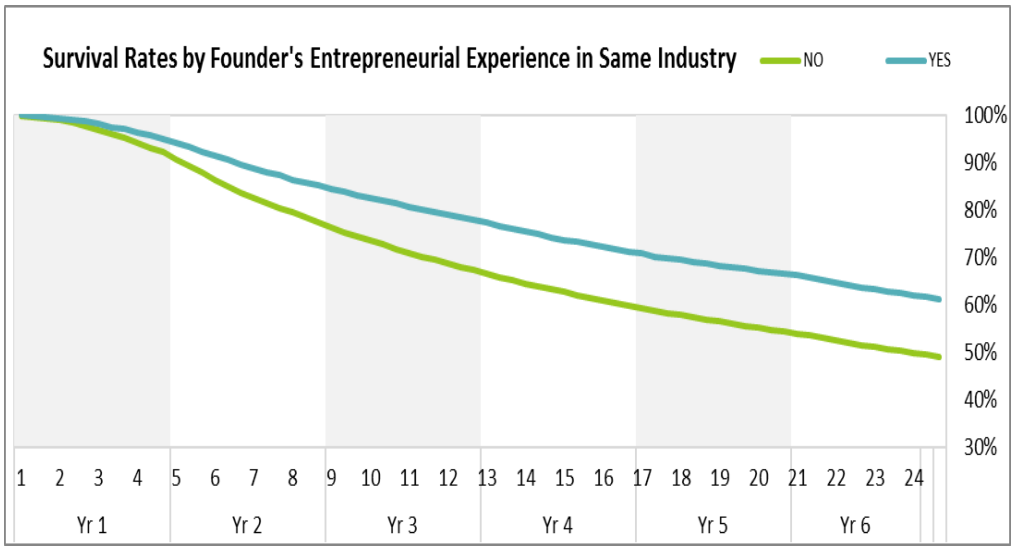
Figure 22 – Founder's Entrepreneurial Experience vs Survival Rates



5.2.3 Founder's Entrepreneurial Experience in Same Industry (as specific industry know-how)

Individual with greater human capital endowment especially in the same industry as the new venture are likely to have better entrepreneurial judgement and more specialised knowledge then other individuals (Colombo and Grilli, 2010). Specific industry know-how brings direct relevant knowledge, skills, experiences, and suppliers and buyers relationships to the new venture that help to reduce the liability of newness. Figure 23 seems to support this argument that industry know-how helps to improve the survivability of the new venture.

Figure 23 – Founder's Entrepreneurial Experience in Same Industry vs Survival Rates



5.3 Social Capital and Survival Rates

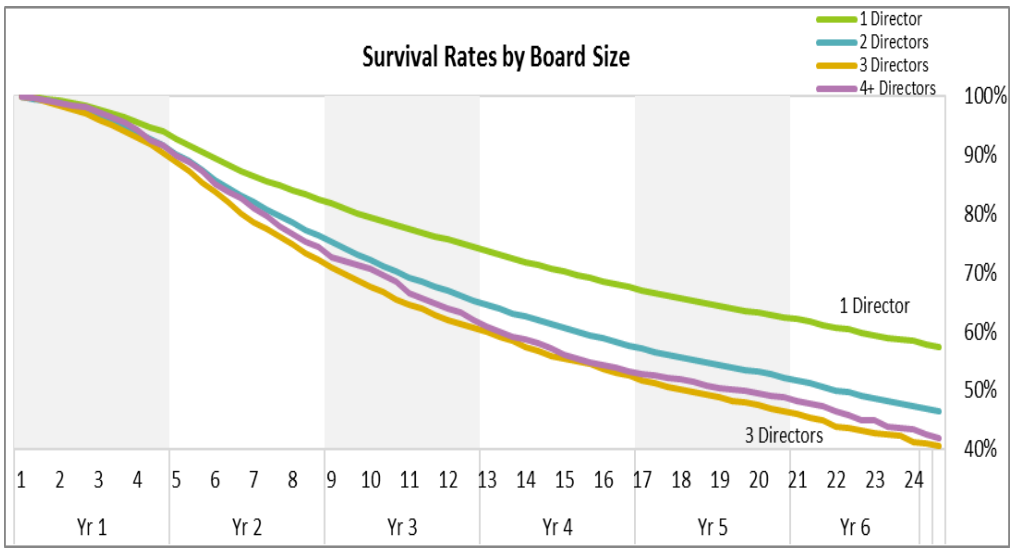
Literature on network-based research in entrepreneurship is the study of interpersonal and interorganisational relationships that links to the outcome of a business venture. Therefore, besides using the company's Board individuals and businesses relationships to proxy the network variables considered in the model, I would further extend the studies to include gender and ethnic diversity that provide both human and social capital resources for small businesses. The section below depicts the preliminary description of the variables used against the company's survival rates over the observation window.

5.3.1 Board Size

Given that a larger board size provides the firm with the ability to secure critical resources, provide strategic advice and reduce uncertainty by bridging any information and skill gaps that helps the firm to survive and

perform (Hillman and Dalziel, 2003; Hillman et al., 2000), the larger the board size should reduce the risk of failure. However, interestingly, Figure 24 seems to suggest that there is potential negative influence of Board size on survival rates.

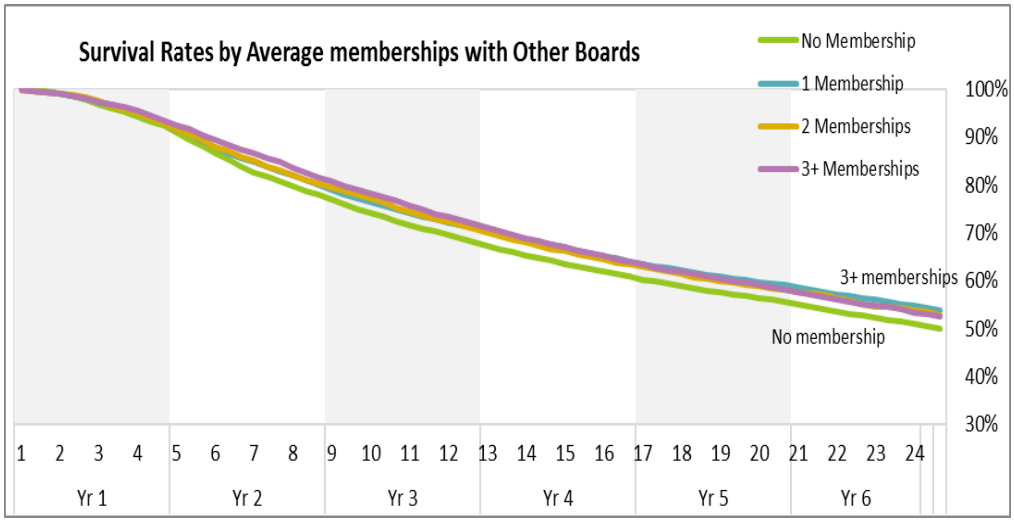
Figure 24 – Board Size vs Survival Rates



5.3.2 Average memberships with Other Boards

One of the key constructs of network-based research in entrepreneurship has largely focus on interpersonal and interorganisational relationships where actors rely on networks for information and advice (Hoang and Antoncic, 2003). Therefore, based on literature, the larger the entrepreneurs network, it should increase the chance of survival. Similarly, Figure 25 also suggests that there is marginal variation in survival rates as the embedded network's degree increases.

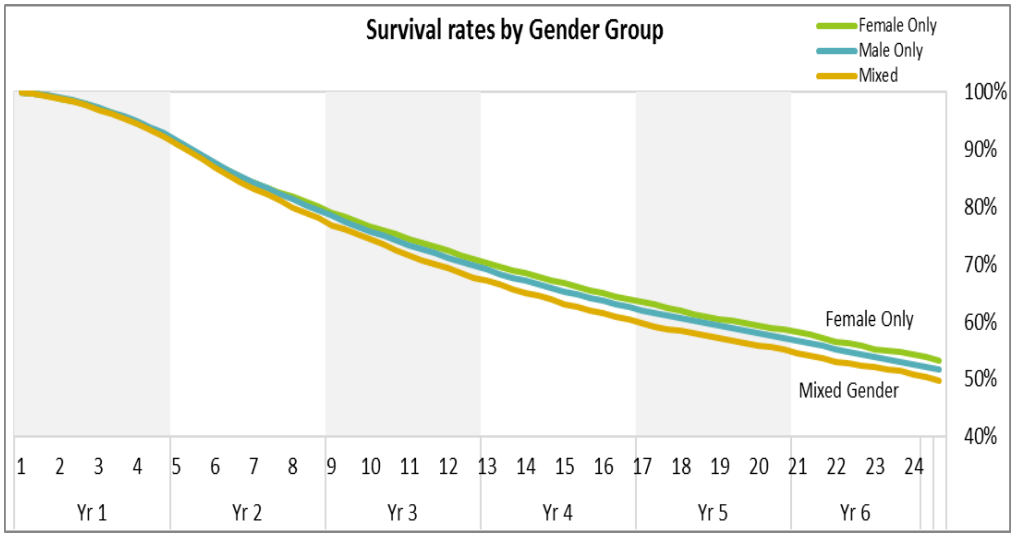
Figure 25 – Average memberships with Other Boards vs Survival Rates



5.3.3 Gender diversity

Literature suggests that gender diversity will bring positive effects to the company by providing different perspectives from the group dynamics resulting in positive impact on the bottom line. Therefore, mixed gender directorships should yield a higher survival rates. However, Figure 26 seems to suggest that mixed gender board perform marginally worst-off then pure female or male board.

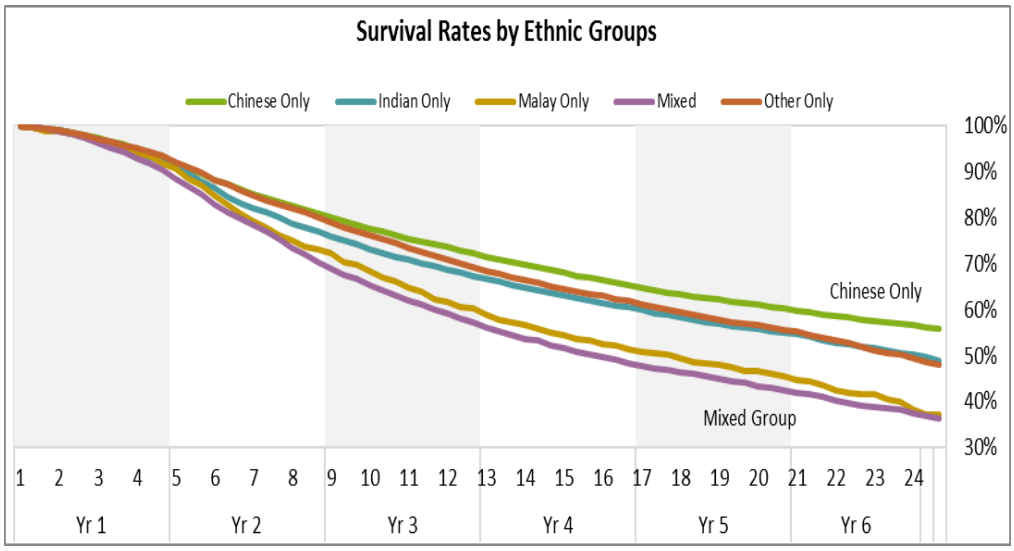
Figure 26 – Gender Diversity vs Survival Rates



5.3.4 Ethnic Diversity (as a proxy of racial diversity)

The study of culture on creativity has been a new research interest recently on how cultural tightness and cultural distance have an influence on innovation (Chua, Roth and Lemoine, 2015). Innovation is a key ingredient to the survival and growth of newly founded businesses. Therefore, given that an individual cultural background is closely linked to his or her ethnicity, Figure 27 suggests that there is a potential correlation between the director's ethnicity and businesses' survivability.

Figure 27 – Ethnic Diversity vs Survival Rates



5.4 Descriptive Statistics & Correlations

Descriptive statistics and correlations between the variables were reported in Table 1. Generally, the resources variables (from financial capital, human capital and social capital) are positively correlated (majority *with* $p<0.001$) among each other. Except for *Net Cashflow* which is mostly not correlated with most resource variables, and *gender concentration HHI* and *ethnic blau's index* which are largely negatively correlated (with $p<0.001$) with the other resources variables.

Similarly, all resource variables are negatively correlated with *Failure event*, except for board size (based on *number of directors*), *gender concentration HHI* and *ethnic blau's index*. This suggest that majority of the resource variables are potentially survival enhancing factors, while board size, gender concentration and ethnic diversity are negative factors to survival.

Majority of the resources variables are also correlated with the macro-economic control variables, except for paid-up capital, possibly due to a one-off nature (i.e. non-time sensitive) of the variable. Thus, suggesting that the resource variables are generally sensitive to the change in macro-economic environment.

Table 1 - Descriptive Statistics & Correlations

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Paid-Up Capital [1]	37.98	2009	1																
2 Bank Balances [1]	12.24	78.56	0.03 ***	1															
3 Net Cashflow [1, 2]	1.56	12.51	0.00	0.10 ***	1														
4 Age of Founder	34.84	2.04	0.00 +	0.03 ***	0.00	1													
5 Years of Entreprenuerial Experience	7.84	8.67	0.01 **	0.11 ***	0.00	0.17 ***	1												
6 Entreprenuerial Experience in Same Industry	0.35	0.48	0.00	0.05 ***	0.00	0.09 ***	0.40 ***	1											
7 Number of Directors	1.71	0.88	0.02 ***	0.11 ***	0.02 ***	0.05 ***	0.08 ***	0.00 +	1										
8 Average number of Other Memberships	3.47	8.76	0.03 ***	0.04 ***	0.01 **	0.04 ***	0.18 ***	0.14 ***	0.08 ***	1									
9 Gender Concentration (Herfindahl Index)	0.88	0.21	0.00 *	-0.02 ***	-0.01 *	-0.05 ***	-0.04 ***	0.01 ***	-0.42 ***	-0.05 ***	1								
10 Ethnic's Blau Index	0.08	0.18	0.02 ***	0.02 ***	0.00	0.02 ***	-0.09 ***	-0.09 ***	0.40 ***	0.15 ***	-0.19 ***	1							
11 Average Age of Board Members	43.78	10.02	-0.01 **	0.04 ***	0.00	0.47 ***	0.29 ***	0.08 ***	-0.01 ***	0.04 ***	-0.04 ***	-0.02 ***	1						
12 New PTE Incorporations (in the year)	36877	3861	0.00	0.03 ***	-0.04 ***	0.11 ***	0.20 ***	0.06 ***	0.03 ***	0.04 ***	-0.02 ***	-0.01 *	0.14 ***	1					
13 Gross Domestic Product (GDP)	402602	29357	0.00	0.05 ***	-0.07 ***	0.15 ***	0.26 ***	0.08 ***	0.04 ***	0.05 ***	-0.03 ***	-0.01 **	0.18 ***	0.79 ***	1				
14 Unemployment	96.02	6.43	0.00	0.05 ***	-0.07 ***	0.14 ***	0.22 ***	0.07 ***	0.03 ***	0.04 ***	-0.03 ***	-0.01 *	0.15 ***	0.41 ***	0.84 ***	1			
15 Composite Leading Index	106.20	4.43	0.00	0.04 ***	-0.04 ***	0.12 ***	0.22 ***	0.07 ***	0.03 ***	0.04 ***	-0.03 ***	-0.01 *	0.15 ***	0.82 ***	0.82 ***	0.70 ***	1		
16 Consumer Price Index (CPI)	98.94	1.75	0.00	0.02 ***	-0.04 ***	0.08 ***	0.13 ***	0.04 ***	0.02 ***	0.05 ***	-0.02 ***	0.00	0.09 ***	0.72 ***	0.66 ***	0.39 ***	0.52 ***	1	
17 Manufacturing (PMI)	50.26	1.95	0.00	0.01 ***	0.00 ***	0.03 ***	0.08 ***	0.02 ***	0.01 ***	0.01 ***	-0.01 ***	0.00	0.06 ***	0.64 ***	0.33 ***	-0.02 ***	0.61 ***	0.41 ***	1
18 Failure Event [3]	0.09	0.28	0.00 *	-0.04 ***	-0.04 ***	-0.06 ***	-0.08 ***	-0.05 ***	0.03 ***	-0.03 ***	0.00	0.06 ***	-0.05 ***	-0.12 ***	-0.13 ***	-0.10 ***	-0.13 ***	-0.06 ***	-0.07 ***

*Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1*

Notes:

1. Based on incremental of $10,000.

2. Winsorized at 1st percentile and 99th percentile.

3. Fail = 1; Survive = 0

6. RESULTS DISCUSSION

The Cox proportional hazards model was run on 161,445 observations with 14,094 *failure* events based on the 36,969 of start-up companies' yearly performance data over the observation window or till they de-registered from ACRA. To test the effects of financial capital, human capital and social capital on survival rates, I took an additive approach to incorporate each category of resources into the model progressively starting from financial capital and subsequently adding human capital and social capital variables into the model. The same set of control variables will be present in all models with industries and locations as the fixed non-time-dependent covariates; and average age of board members, yearly new private limited incorporations and economic indicators as the time-dependent covariates. The section below depicts the results of regression model.

6.1 Role of Financial Capital

Table 2 show the list of financial capital variables considered in the Cox model with paid-up capital as the fixed non-time-dependent covariate; and bank balances and net cashflow as the time-dependent covariates.

Using *Paid-up Capital* as an imprinting resource, regression Model-1 shows that it has a highly statistically significant covariate coefficient of -0.0010 with $p<0.001$. The negative coefficient suggests that *Paid-up Capital* is a positive survival factor. Thus, supporting Hypothesis 1 of increasing

imprinting resources will help in increasing survival rates. With a hazard ratio of 0.9990 (exp(β)), indicates that for every ten thousand dollars increase in paid-up capital, it will help to reduce the failure rate by 0.1%, suggesting that the positive impact on survival is relatively small despite its significance.

Table 2 – Cox model: Financial Capital effect

		Financial Capitals				*Effect on Survival*
		Model 1		Model 2		
		coef	exp(coef)	coef	exp(coef)	
Financials Resources	***Imprinting Resources***					
	Paid-Up Capital [1]	-0.0010 ***	0.9990	-0.0010 ***	0.9990	*Positive*
	Absolute Slack					
	Bank Balances [1]	-0.0427 ***	0.9582	-0.0322 ***	0.9684	*Positive*
	Transient Slack					
	Net Cashflow (absolute) [1, 2]	-0.3267 ***	0.7213			*Positive*
	Net Cashflow (absolute)_square [1, 2]	0.0047 ***	1.0047			*Negative*
	High_Shortfall (against Breakeven) [3]			-1.4790 ***	0.2280	*Positive*
	Mild_Shortfall (against Breakeven) [3]			-1.1550 ***	0.3150	*Positive*
	Mild_Surplus (against Breakeven) [3]			-1.9060 ***	0.1487	*Positive*
	High_Surplus (against Breakeven) [3]			-2.5160 ***	0.0808	*Positive*
	Control Variables					
	New PTE Incorporations (in the year)	0.0005 ***	1.0005	0.0005 ***	1.0005	
	Gross Domestic Product (GDP)	-0.0001 ***	0.9999	-0.0001 ***	0.9999	
	Unemployment	0.4519 ***	1.5713	0.4745 ***	1.6073	
	Composite Leading Index	-0.4814 ***	0.6179	-0.5068 ***	0.6024	
	Consumer Price Index (CPI)	-0.0117	0.9883	-0.0214	0.9789	
	Manufacturing_PMI	0.3931 ***	1.4815	0.4134 ***	1.5120	
	Average Age of Board Members	-0.0060 ***	0.9940	-0.0059 ***	0.9942	
	Industries (based on 2-digit SSIC)					
	Locations (based on 2-digit District code)					
	Numebr of Observations (N)	161,445		161,445		
	Numebr of Event	14,094		14,094		
	Likelihood ratio test	10,656 ***		14,616 ***		
	Wald test	5,104 ***		9,757 ***		
	Score (logrank) test	6,111 ***		14,025 ***		

*Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 ' + ' 0.1*

Notes:

1. Based on incremental of $10,000.

2. Winsorized at 1st percentile and 99th percentile.

3. High_Shortfall is more than -$50,000; Mild_Shortfall is between [-$50,000, -$5,000); Breakeven is between [-$5,000, $5,000]; Mild_Surplus is between ($5,000, $50,000]; High_Surplus is more than $50,000.

For discretionary absolute slack, I have used *Bank Balances* as a proxy measurement. Based on regression Model-1, the covariate coefficient of -0.0427 is also highly statistically significant with $p<0.001$, and the negative coefficient similarly suggest that *Bank Balances* is also a positive survival factor. Thus, supporting Hypothesis 2. The hazard ratio of 0.9582 ($\exp(\beta)$) also indicates that for every ten thousand dollars increase in bank balances will reduce the failure rate by 4.18%. Thus, suggest that the time-dependent discretionary absolute slack potentially plays a more central role in influencing the survivability of the small businesses.

Transient slack is hypothesised to have a curvilinear relationship with survival rates. Using *Net Cashflow* as a proxy measurement with both positive and negative values, for regression Model-1, I *absolute* the variable to make it a positive integer and introduce a square term of the same variable to test the curvilinear relationship. Results suggest that deviation (in either direction, as shortfall or surplus, since it is the *absolute* value) from "breakeven" is highly statistically significant with $p<0.001$ and enhances survival, but at a decreasing rate (based on the squared term). This suggest that the curvilinear relationship holds.

In order to ensure robustness in supporting the curvilinear hypothesis, I further construct a Model-2 by categorising the annual net cashflow into dummy variables for companies with *High Shortfall* (more than -$50,000 shortfall), *Mild Shortfall* (shortfall between -$50,000 and -$5,000), *Breakeven* (between -$5,000 and +$5,000), *Mild Surplus* (surplus between +$5,000 and +$50,000), or *High Surplus* (exceeding +$50,000 surplus). Results again suggest that *High Shortfall*, *Mild Shortfall*, *Mild Surplus*, and *High Surplus*

can better enhance survival (with *p<0.001* significant) as compared with *Breakeven*. Further comparison of coefficients test (refer to table 3), shows that the magnitude of survival enhancement is stronger for *High Shortfall and High Surplus*. Thus, supporting Hypothesis 3 of a 'U-shape' curvilinear relationship between transient slack and survival rates.

Table 3 – Comparison of Coefficients Test

```
Linear hypothesis test

Hypothesis:
High_Shortfall - Mild_Shortfall = 0

Model 1: restricted model
Model 2: Surv(time0, time1, Fail_trigger) ~ Paid_Up_Capital + Bank_Balances +
    High_Shortfall + Mild_Shortfall + Mild_Surplus + High_Surplus +
    New_Incorp_PTE + GDP_Amt + Unemployment_Nbr + Composite_Leading_Index +
    CPI + Manufacturing_PMI + Locations + Industry

  Res.Df Df  Chisq Pr(>Chisq)
1 174244
2 174243  1 30.872  2.757e-08 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Linear hypothesis test

Hypothesis:
- Mild_Surplus  + High_Surplus = 0

Model 1: restricted model
Model 2: Surv(time0, time1, Fail_trigger) ~ Paid_Up_Capital + Bank_Balances +
    High_Shortfall + Mild_Shortfall + Mild_Surplus + High_Surplus +
    New_Incorp_PTE + GDP_Amt + Unemployment_Nbr + Composite_Leading_Index +
    CPI + Manufacturing_PMI + Locations + Industry

  Res.Df Df  Chisq Pr(>Chisq)
1 174244
2 174243  1 69.632  < 2.2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

In summary, the regression results support the hypothesis that financial resources (i.e. imprinting resources, absolute slack and transient slack at varying magnitudes of impact) have a positive effect on the survival rates of start-ups.

6.2 Role of Human Capital

Table 4 show the list of human capital variables considered in the Cox Model-3 and Model-4, namely variables of founder's age, entrepreneurial experience and entrepreneurial experience in the same industry are added into the model.

Using *Age of founder* as a general human capital to proxy the founder's life experience, regression Model-3 shows that it has a highly statistically significant covariate coefficient of -0.0150 with $p<0.001$ (with $p<0.01$ in Model-4). The negative coefficient suggests that *Age of founder* is a positive survival factor. Thus, supporting Hypothesis 4 of increasing age of founders will help in increasing survival rates. With a hazard ratio of 0.9851 (exp(β)), indicates that for every year older in age of founder, it will help to reduce the failure rate by 1.49%. Similar results depicted in Model-4.

For *Founder's Entrepreneurial Experience* variable, results show that the covariate coefficient of -0.0079 is also highly statistically significant with $p<0.001$ (-0.0070 in Model-4 with $p<0.001$), and the negative coefficient similarly suggest that *Founder's Entrepreneurial Experience* is also a positive survival factor. Thus, supporting Hypothesis 5 on the importance of business management expertise to the survival of start-ups. However, the hazard ratio of 0.9922 (exp(β)), indicates that for one additional year of business management experience, it only reduces the failure rate by 0.78%. Therefore, the magnitude of which founder's entrepreneurial experience can help in increasing survival rates seems relatively marginal.

The lack of Industry know-how had coined by researchers as one key determinant of the 'liability of newness'. Model-3 results support this argument with a highly statistically significant covariate coefficient of -0.0916 for *Entrepreneurial Experience in the Same Industry* with $p<0.001$. Furthermore, with a hazard ratio of 0.9125 (exp(β)), indicates that founders with *Entrepreneurial Experience in the Same Industry*, will help to reduce the failure rate by 8.75%. Therefore, suggesting a more influential role *Industry know-how* plays in the survivability of the small businesses. Hence, supporting Hypothesis 6. Likewise, Model-4 depicts similar results.

In summary, the regression results also supports the hypothesis that human resources (i.e. founder's age, entrepreneurial experience and entrepreneurial experience in the same industry at varying magnitudes of impact) have a positive effect on the survival rates of start-ups. Furthermore, despite the addition of human capital variables into the model, results of the financial capital variables remained consistent and statistically significant.

Table 4 – Cox model: Human Capital effect

		+ Human Capitals				*Effect on Survival*
		Model 3		Model 4		
		coef	exp(coef)	coef	exp(coef)	
Financials Resources	***Imprinting Resources***					
	Paid-Up Capital [1]	-0.0011 ***	0.9989	-0.0010 ***	0.9990	*Positive*
	Absolute Slack					
	Bank Balances [1]	-0.0472 ***	0.9539	-0.0360 ***	0.9647	*Positive*
	Transient Slack					
	Net Cashflow (absolute) [1, 2]	-0.3289 ***	0.7197			*Positive*
	Net Cashflow (absolute)_square [1, 2]	0.0048 ***	1.0048			*Negative*
	High_Shortfall (against Breakeven) [3]			-1.4590 ***	0.2325	*Positive*
	Mild_Shortfall (against Breakeven) [3]			-1.1490 ***	0.3171	*Positive*
	Mild_Surplus (against Breakeven) [3]			-1.8990 ***	0.1497	*Positive*
	High_Surplus (against Breakeven) [3]			-2.4790 ***	0.0838	*Positive*
Human Resources	***Founder's Age***					
	Age of Founder	-0.0150 ***	0.9851	-0.0121 **	0.9880	*Positive*
	Founder's Entreprenuerial Experience					
	Years of Entreprenuerial Experience	-0.0079 ***	0.9922	-0.0070 ***	0.9930	*Positive*
	Founder's Same Industry Experience					
	Entreprenuerial Experience in Same Industry	-0.0916 ***	0.9125	-0.0768 ***	0.9261	*Positive*
	Control Variables					
	New PTE Incorporations (in the year)	0.0005 ***	1.0005	0.0005 ***	1.0005	
	Gross Domestic Product (GDP)	-0.0001 ***	0.9999	-0.0001 ***	0.9999	
	Unemployment	0.4510 ***	1.5699	0.4730 ***	1.6048	
	Composite Leading Index	-0.4808 ***	0.6183	-0.5056 ***	0.6031	
	Consumer Price Index (CPI)	-0.0087	0.9913	-0.0187	0.9815	
	Manufacturing_PMI	0.3913 ***	1.4790	0.4108 ***	1.5080	
	Average Age of Board Members	-0.0025 *	0.9975	-0.0030 **	0.9970	
	Industries (based on 2-digit SSIC)					
	Locations (based on 2-digit District code)					
	Numebr of Observations (N)	161,445		161,445		
	Numebr of Event	14,094		14,094		
	Likelihood ratio test	10,172 ***		13,735 ***		
	Wald test	4,876 ***		9,091 ***		
	Score (logrank) test	5,850 ***		13,147 ***		

*Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 ' + ' 0.1*

Notes:

1. Based on incremental of $10,000.

2. Winsorized at 1st percentile and 99th percentile.

3. High_Shortfall is more than -$50,000; Mild_Shortfall is between [-$50,000, -$5,000); Breakeven is between [-$5,000, $5,000]; Mild_Surplus is between ($5,000, $50,000]; High_Surplus is more than $50,000.

6.3 Role of Social Capital

Table 5 show the list of social capital variables considered in the Cox Model-5 and Model-6, namely board size, average number of membership with other boards, gender diversity and ethnic diversity are added into the model. Given the significant proportion of single director board, in order to correctly capture the social capital effects, a dummy variable on single direct company was further added into the model as a control variable.

Scholars have suggested that *board size* is a measure of an organisation's ability to form external links in order to secure critical resources (Goodstein et al., 1994). However, regression Model-5 results suggest that *board size* is a negative survival factor with a highly statistically significant positive covariate coefficient of 0.0727 with $p<0.001$, after controlling for single direct board. With a hazard ratio of 1.0754 ($\exp(\beta)$), indicates that for every increase in director count, it will increase the failure rate by 7.54%. Thus, rejecting Hypothesis 7. Similar results depicted in Model-6.

Table 5 – Cox model: Social Capital effect

		+ Social Capitals						
		Model 5		Model 6		Model 7		***Effect on Survival***
		coef	exp(coef)	coef	exp(coef)	coef	exp(coef)	
Financials Resources	***Imprinting Resources***							
	Paid-Up Capital [1]	-0.0012 ***	0.9988	-0.0012 ***	0.9988	-0.0012 ***	0.9988	*Positive*
	Absolute Slack							
	Bank Balances [1]	-0.0481 ***	0.9531	-0.0369 ***	0.9638	-0.0482 ***	0.9530	*Positive*
	Transient Slack							
	Net Cashflow (absolute) [1, 2]	-0.3234 ***	0.7237			-0.3237 ***	0.7235	*Positive*
	Net Cashflow (absolute)_square [1, 2]	0.0047 ***	1.0047			0.0047 ***	1.0047	*Negative*
	High_Shortfall (against Breakeven) [3]			-1.4580 ***	0.2327			*Positive*
	Mild_Shortfall (against Breakeven) [3]			-1.1390 ***	0.3202			*Positive*
	Mild_Surplus (against Breakeven) [3]			-1.8790 ***	0.1527			*Positive*
	High_Surplus (against Breakeven) [3]			-2.4670 ***	0.0848			*Positive*
Human Resources	***Founder's Age***							
	Age of Founder	-0.0213 ***	0.9789	-0.0174 ***	0.9827	-0.0207 ***	0.9795	*Positive*
	Founder's Entreprenuerial Experience							
	Years of Entreprenuerial Experience	-0.0061 ***	0.9939	-0.0051 ***	0.9949	-0.0061 ***	0.9939	*Positive*
	Founder's Same Industry Experience							
	Entreprenuerial Experience in Same Industry	-0.0432 *	0.9577	-0.0300 *	0.9705	-0.0436 *	0.9573	*Positive*
Social Resources	***Board Size***							
	Number of Directors	0.0727 ***	1.0754	0.0662 ***	1.0684	0.4022 ***	1.4951	*Negative*
	Single Director Company_dummy	-0.2911 ***	0.7475	-0.2804 ***	0.7555	-0.3083 ***	0.7347	*Positive*
	Memberships with other Boards							
	Average number of Other Memberships	-0.0162 ***	0.9840	-0.0167 ***	0.9835	-0.0164 ***	0.9837	*Positive*
	Gender Diversity							
	Gender Concentration_Herfindahl Index	0.4114 ***	1.5090			1.1940 ***	3.2991	*Negative*
	Percentage of Female	0.0002	1.0002			0.0001	1.0001	
	Female Only Board (against Mixed Board)			0.1927 ***	1.2126			*Negative*
	Male Only Board (against Mixed Board)			0.1545 ***	1.1671			*Negative*
	Ethnicity Diversity							
	Ethnic's Blau Index	0.3474 ***	1.4154	0.2344 ***	1.2642	0.9448 ***	2.5724	*Negative*
	Board Size X Diversities							
	Number of Directors X Ethnic's Blau Index					-0.2588 ***	0.7720	*Positive*
	Control Variables							
	New PTE Incorporations (in the year)	0.0005 ***	1.0005	0.0005 ***	1.0005	0.0005 ***	1.0005	
	Gross Domestic Product (GDP)	-0.0001 ***	0.9999	-0.0001 ***	0.9999	-0.0001 ***	0.9999	
	Unemployment	0.4523 ***	1.5720	0.4739 ***	1.6063	0.4525 ***	1.5722	
	Composite Leading Index	-0.4831 ***	0.6169	-0.5074 ***	0.6021	-0.4833 ***	0.6167	
	Consumer Price Index (CPI)	-0.0080	0.9921	-0.0176	0.9826	-0.0079	0.9921	
	Manufacturing_PMI	0.3923 ***	1.4804	0.4113 ***	1.5087	0.3925 ***	1.4807	
	Average Age of Board Members	-0.0012	0.9988	-0.0018 +	0.9982	-0.0014	0.9986	
	Industries (based on 2-digit SSIC)							
	Locations (based on 2-digit District code)							
	Numebr of Observations (N)	161,445		161,445		161,445		
	Numebr of Event	14,094		14,094		14,094		
	Likelihood ratio test	10,871 ***		14,323 ***		10,909 ***		
	Wald test	5,666 ***		9,688 ***		5,705 ***		
	Score (logrank) test	6,635 ***		13,736 ***		6,667 ***		

*Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1*

Notes:

1. Based on incremental of $10,000.

2. Winsorized at 1st percentile and 99th percentile.

3. High_Shortfall is more than -$50,000; Mild_Shortfall is between [-$50,000, -$5,000); Breakeven is between [-$5,000, $5,000]; Mild_Surplus is between ($5,000, $50,000]; High_Surplus is more than $50,000.

Although researchers have not reached an agreement on the direction of board size relationship with performance, there are possible reasons why larger board size will lead to a negative effect on firm's survivability. Firstly, the possibly lack of group cohesiveness in a larger board affects the ability for the team to be united and work together, potentially inhibit the board's ability to rollout strategic actions. Thus, larger boards may be less cohesive, less participative and less able to reach consensus (Dalton et al., 1999). Next, larger boards might encourage social loafing reducing the effort exercised by an individual as the board size increases (Sheppard, 1993). Lastly, potential formation of cliques and coalitions developed in a larger board that might lead to group conflict that will impact the ability to reach consensus and react quickly or decisively during crisis, thus potentially impacting the survivability of the company (Daily and Dalton, 1994a, 1994b).

While increasing board size does not provide the social capital to increase survivability, entrepreneurs' can still leverage on their social network (both formal and informal) to provide the social capital required for information, referrals and secure critical resources. Using *Average number of memberships with Other Boards* as a proxy for social capital, results from the regression Model-5 shows that it has a highly statistically significant covariate coefficient of -0.0162 with $p<0.001$. The negative coefficient suggests that *Memberships with Other Boards* is a positive survival factor. Thus, supporting Hypothesis 8 of increasing number of memberships with other boards will provide the social capital to enhance survival rates. With a hazard ratio of 0.9840 ($\exp(\beta)$), indicates that for every increase in membership with other

board, it will help to reduce the failure rate by 1.60%. Similar results are also depicted in Model-6.

Diversity of the Board provides the heterogeneity required in the group to allow for harvesting a broader range of ideas and information, thus promoting innovation. Hence, studies have suggested that diversity can provide both the human and social capital to enhance survivability. Using Herfindahl–Hirschman Index (HHI) to measure *gender concentration* within the board and Blau's Index to measure *ethnic diversity* in the board, results are mixed from the regression models. Base on regression Model-5, results suggest that *gender concentration* is a negative survival factor with a highly statistically significant positive covariate coefficient of 0.4114 with $p<0.001$, after controlling for single direct board. Thus, support Hypothesis 9 that gender diversity enhances survival (i.e. reverse interpretation of the results). To further test the robustness of this result, I further construct in Model-6 dummy variables for companies with *Female only* board, *Male only* board and *Mixed Gender* board. Results again suggest that board with *Female only* and *Male only* will lead to higher failure rates (with $p<0.001$ significant) as compared with *Mixed Gender* board. Hence, further supporting Hypothesis 9.

Using Blau's Index to measure *ethnic diversity* in the board yield a different result. Based on regression Model-5, the covariate coefficient of 0.3474 is also highly statistically significant with $p<0.001$, and the positive coefficient suggest that *ethnic diversity* is a negative survival factor. Thus, rejecting Hypothesis 10. Despite yielding a negative result, there are possible reasons why ethnic diversity will lead to a negative effect on firm's survivability. One possible reason is low level of ethnic (racial) diversity

encourage interaction and communication among members of the board that will facilitate knowledge-sharing resulting in performance effectiveness. However, as ethnic (racial) diversity increases, it may create barriers reducing the interaction and cohesiveness of the team (Richard et al., 2007). Similar to the board size effect discussed above.

Given that board size and ethnic diversity seems to encourage smaller similar group network as a positive social capital endowment, I further construct a regression Model-7 to include the interaction effects of Board Size and Ethnic Diversity, namely '*Number of Directors X Ethnic Diversity*'. Result seem to suggest that as board size increases to sufficiently large, ethnic diversity can positively help to moderate the effect to enhance survivability (negative coefficients with $p<0.001$).

In summary, although the regression results support a relationship between social capital and survival of start-ups, but the direction of the relationships are mixed. Despite the mixed results on social capital variables, the results of the human capital and financial capital variables remained consistent and statistically significant.

6.4 Moderating effects of Financial Capital

Literatures suggest that both human and social capital endowment of the board provides for a more exhaustive ideas generated for identification, development and selection of decisions. Based on the behavioural theory of firm and resource-constraint literature, firm's decision-making process will also be influenced by the level of financial capital available. Thus, with the

availability of financial slack, the board can be more liberal and creative in their decision-making process with less constraints. This should result in improvement to the performance of the new venture and further enhance survivability. In Table 6, I have constructed interaction models to capture the moderating effects of financial capital.

The results from regression Model-8 seems to suggest that financial capital generally have a negative moderating effect between human capital and companies' survival, i.e. rejecting Hypothesis 11. Specifically, higher *bank balances* seem to negatively moderate the effect of *founder's age* and *entrepreneurial experience in the same industry* on companies' survival. This suggest that with the availability of higher absolute slack, older founders or those with industry know-how tends to undertake more risky projects or decisions resulting in negative performance. Thus, not leveraging the strength of founder's human capital to deploy or utilise the available slack resources effectively and efficiently. Similar observation on the availability of higher imprinting resources (i.e. paid-up capital) also negatively moderates the effect between industry know-how and companies' survival. Although, the model results show that Net Cashflow has a positively moderating effect between founder's age and companies' survival, the effect is very small with a hazard ratio of 0.9973 (exp(β)), i.e. reduce failure rate by a marginal 0.27% only.

Similarly, regression Model-9 also suggest that financial capital generally have a negative moderating effect between social capital and companies' survival, i.e. rejecting Hypothesis 12. Thus, suggesting that with the availability of higher imprinting resources (*paid-up capital*), absolute slack (*bank balances*) and transient slack (*net cashflow*), entrepreneurs are not

leveraging their strength of social capital to deploy or utilise the available slack resources effectively and efficiently. The only exception is the effect of net cashflow on average membership with other boards and companies' survival, but the impact is also very small with a hazard ratio of 0.9992 (exp(β)), i.e. reduce failure rate by a marginal 0.08% only.

In summary, hypothesis 11 and 12 are rejected, as results show that financial capital negatively moderate the relationship between human capital and survival rates; and social capital and survival rates.

Table 6 – Cox model: Moderating effects of Financial Capital

		+ Financial X Human Capital Model 8		Effect on Survival	+ Financial X Social Capital Model 9		Effect on Survival
		coef	exp(coef)		coef	exp(coef)	
Financials Resources	***Imprinting Resources***						
	Paid-Up Capital [1]	-0.0244 *	0.9759	*Positive*	-0.0288 *	0.9716	*Positive*
	Absolute Slack						
	Bank Balances [1]	-0.3388 ***	0.7126	*Positive*	-0.3689 ***	0.6915	*Positive*
	Transient Slack						
	Net Cashflow (absolute) [1, 2]	-0.4027 ***	0.6685	*Positive*	-0.3940 ***	0.6744	*Positive*
	Net Cashflow (absolute)_square [1, 2]	0.0068 ***	1.0068	*Negative*	0.0066 ***	1.0067	*Negative*
Human Resources	***Founder's Age***						
	Age of Founder	-0.0289 ***	0.9715	*Positive*	-0.0282 ***	0.9722	*Positive*
	Founder's Entreprenuerial Experience						
	Years of Entreprenuerial Experience	-0.0065 ***	0.9935	*Positive*	-0.0056 ***	0.9945	*Positive*
	Founder's Same Industry Experience						
	Entreprenuerial Experience in Same Industry	-0.1230 ***	0.8843	*Positive*	-0.1072 ***	0.8983	*Positive*
Social Resources	***Board Size***						
	Number of Directors	0.3978 ***	1.4886	*Negative*	0.4262 ***	1.5315	*Negative*
	Single Director Company_dummy	-0.3162 ***	0.7289	*Positive*	-0.3238 ***	0.7234	*Positive*
	Memberships with other Boards						
	Average number of Other Memberships	-0.0165 ***	0.9836	*Positive*	-0.0175 ***	0.9826	*Positive*
	Gender Diversity						
	Gender Concentration_Herfindahl Index	1.1910 ***	3.2912	*Negative*	1.1650 ***	3.2064	*Negative*
	Percentage of Female	0.0002	1.0002		0.0002	1.0002	
	Ethnicity Diversity						
	Ethnic's Blau Index	0.8655 ***	2.3762	*Negative*	0.7966 ***	2.2180	*Negative*
Moderating Effects	***Board Size X Diversities***						
	Number of Directors X Ethnic's Blau Index	-0.2430 ***	0.7843	*Positive*	-0.2665 ***	0.7660	*Positive*
	Financial X Human Capital						
	Paid-Up Capital [1] X Age of Founder	0.0006 +	1.0006	*Negative*	0.0005	1.0005	
	Paid-Up Capital [1] X Yrs of Entr Experience	0.0000	1.0000		0.0000	1.0000	
	Paid-Up Capital [1] X Entr Exp in Same Industry	0.0020 ***	1.0020	*Negative*	0.0015 **	1.0015	*Negative*
	Bank Balances [1] X Age of Founder	0.0078 ***	1.0079	*Negative*	0.0074 ***	1.0074	*Negative*
	Bank Balances [1] X Yrs of Entr Experience	0.0002	1.0002		-0.0001	0.9999	
	Bank Balances [1] X Entr Exp in Same Industry	0.0338 ***	1.0344	*Negative*	0.0295 ***	1.0299	*Negative*
	Net Cashflow [1, 2] X Age of Founder	-0.0027 ***	0.9973	*Positive*	-0.0032 ***	0.9968	*Positive*
	Net Cashflow [1, 2] X Yrs of Entr Experience	-0.0002	0.9998		-0.0002	0.9998	
	Net Cashflow [1, 2] X Entr Exp in Same Industry	0.0061	1.0061		0.0070	1.0070	
	Financial X Social Capital						
	Paid-Up Capital [1] X Number of Directors				0.0004 **	1.0004	*Negative*
	Paid-Up Capital [1] X Avg nbr of Other Memberships				0.0000	1.0000	
	Paid-Up Capital [1] X Gender Concentration_HHI				0.0076 **	1.0076	*Negative*
	Paid-Up Capital [1] X Ethnic's Blau Index				0.0003	1.0003	
	Bank Balances [1] X Number of Directors				0.0018 +	1.0018	
	Bank Balances [1] X Avg nbr of Other Memberships				0.0001	1.0001	
	Bank Balances [1] X Gender Concentration_HHI				0.0347 ***	1.0353	*Negative*
	Bank Balances [1] X Ethnic's Blau Index				0.0688 ***	1.0712	*Negative*
	Net Cashflow [1, 2] X Number of Directors				0.0038 *	1.0038	*Negative*
	Net Cashflow [1, 2] X Avg nbr of Other Memberships				-0.0008 ***	0.9992	*Positive*
	Net Cashflow [1, 2] X Gender Concentration_HHI				0.0105	1.0106	
	Net Cashflow [1, 2] X Ethnic's Blau Index				0.0190 *	1.0191	*Negative*

Control Variables - *same as Model 1-7*

*Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1*

Notes:

1. Based on incremental of $10,000.

2. Winsorized at 1st percentile and 99th percentile.

6.5 Control variables and Overall Significance of the Models

Yearly *New private limited incorporation* covariate coefficient is statistically significant with $p<0.001$ across all models. The positive coefficient suggest that imprinting condition of yearly new competitions will have a negative effect on new venture survival.

All the economic indicators (GDP, Unemployment Rate, Composite Leading Index, and Manufacturing PMI) coefficients are statistically significant except for Consumer Price Index. This suggest that imprinting and ongoing economic conditions have an impact to the survivability of the start-ups given that given small businesses represent more than 95% of all employer firms and generate a substantial share of employment for the economy.

For *Industries* covariate (rollup to 2-digit SSIC categories) and *Locations* (rollup to the 28 districts in Singapore), the coefficient estimates for some industries and locations were statistically significant in reducing failure rates. Thus, suggest that there are potential constructive effects like innovation clusters location and industries' intensity that might supports the survival of small businesses.

Lastly, on the overall significance of the models (i.e. Model 1-9), the results from the Likelihood-ratio test, Wald test and Score (logrank) test indicate a good fit of the overall model with $p<0.001$ for all the models tested in this study.

7. CONCLUSION AND IMPLICATIONS

This study provides valuable insights into the role of resources (i.e. financial capital, human capital and social capital) in survival of start-ups. Overall, the results provide statistically significant empirical evidence on the relationship between the various resources and survival of start-ups, with both financial and human capital positively enhances survivability but social capital having mixed direction of the relationship. However, if board size increases to sufficiently large, results show that ethnic diversity can positively help to moderate the relationship, i.e. enhancing survivability. Further study on the moderating effect of financial capital, suggest that with the availability of slack resources, entrepreneurs are not leveraging their strength of founder's human capital and social capital effectively when deploying or utilising it, potentially undertaking more risky projects or sub-optimal decisions resulting in negative effect on performance.

There are major practical implications that can be derive from this study. One key implication is the ability for entrepreneurs to accurately identify the resources that can influence their survival. What financial resources matters and who can assist, train and advise them for their new ventures. In no way do I imply that the variables considered in my study is exhaustive contributing to survival, but they cover across time from point of new venture incorporation into the imprinting phase follow by early phase of the business life-cycle. It is striking that this limited set of variables can influence considerably the survival of new ventures.

Some of the entrepreneurial competencies cannot be changed simply. However, this study allows use to assess the benefits or risks associate with them. Entrepreneurs whose resource reduces their chance of survival should track with caution or acquire new resources to strengthen their situation. For example, entrepreneur with low financial resources should leverage or acquire more social capital to strengthen their position by bridging any information and skill gaps that helps the firm to innovate and survive.

This study also provides valuable insights into how the different resources influence the survivability of small businesses by making several important contributions to the organisational and entrepreneurship theory. First, the empirical study provides a casual logic of how the different resources (financial, human and social capital) influence the firm's survival. The model allows us to dimension the magnitude of each respective resource influencing the firm's survivability. The additive model approach (adding resources into the model one at a time without remove the prior ones) allow us to estimate the effects accurately and holistically within one system, i.e. not in isolation of each resources. Thus, advancing our understanding of entrepreneurship literature.

Second, this study also makes a theoretical contribution to the board governance structure and diversity research by exploring the effects of board size, directors' memberships with other boards and board diversity on small business survivability. In fact, Daily et al. (2002) also calls for research to focus on how board composition and board size impact the firm survival due to the absent in current literature. This study further advances the current literature by examining how financial resources can potentially further

moderates the effect the human and social capitals on the survivability of the business.

Third, this is one of the few studies that provide empirical evidence to test and find support the impact of resource constraints cover across time from point of new venture incorporation to imprinting phase to early phase of the business life-cycle. Therefore, with the availability of large-sample longitudinal private data capturing inter-temporal changes, which have been limited in the past proves especially informative.

Lastly, given small businesses represent more than 95% of all employer firms and generate a substantial share of employment for the economy, their survivability, sustainability and subsequent success in the marketplace is important to support our economy. Thus, understanding their survivability is important from a practitioner point of view. For example, given that growth is conditional upon survival, banks can now potentially leverage the findings of this study to improve their lending criteria and catch the early growth cycle of small businesses in their initial years of setup.

In conclusion, I believe that the efforts to understand the drivers that predict start-ups survivability constitute one of the important streams of entrepreneurial research that is useful to the academic and practitioner communities. I trust that this study reported here is a modest step towards a better understanding of these relationships, and hope it is a stimulus for further future research in this area.

REFERENCE

Ackerman, P. L., & Humphreys, L. G. (1990). Individual differences theory in industrial and organizational psychology. *Handbook of industrial and organizational psychology, 1*, 223-282.

Aghion, P., Blundell, R., Griffith, R., Howitt, P., & Prantl, S. (2009). The effects of entry on incumbent innovation and productivity. *The Review of Economics and Statistics*, *91*(1), 20-32.

Aghion, P., Fally, T., & Scarpetta, S. (2007). Credit constraints as a barrier to the entry and post-entry growth of firms. *Economic policy*, *22*(52), 732-779.

Aldrich, H., & Zimmer, C. (1986). Entrepreneurship through social networks. In D.L. Sexton & R.W. Smiler (Eds.), *The Art and Science of Entrepreneurship* (pp. 3-23). Cambridge, MA: Ballinger.

Alexander, J. A., Fennell, M. L., & Halpern, M. T. (1993). Leadership instability in hospitals: The influence of board-CEO relations and organizational growth and decline. *Administrative Science Quarterly*, 74-99.

Angelini, P., & Generale, A. (2008). On the evolution of firm size distributions. *American Economic Review*, *98*(1), 426-38.

Audretsch, D., Keilbach, M., Lehmann, E., & Oxford Scholarship Online. (2006). *Entrepreneurship and Economic Growth* , Oxford ; New York : Oxford University Press.

Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative science quarterly*, *50*(3), 329-366.

Baum, J. R., Locke, E. A., & Smith, K. G. (2001). A multidimensional model of venture growth. *Academy of management journal*, *44*(2), 292-303.

Becker, G. S. (2009). *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago ; London : University of Chicago press.

Birley, S. (1985). The role of networks in the entrepreneurial process. *Journal of business venturing*, *1*(1), 107-117.

Boeker, W. (1989). Strategic change: The effects of founding and history. *Academy of Management journal*, *32*(3), 489-515.

Bourgeois, L. J. (1981). On the measurement of organizational slack. *Academy of Management review*, *6*(1), 29-39.

Bourgeois, L., & Singh, J. (1983). Organizational Slack and Political Behavior Among Top Management Teams. *Academy of Management Proceedings*, 1983(1), 43-47.

Brass, D. J. (1992). Power in organizations: A social network perspective. *Research in politics and society*, *4*(1), 295-323.

Bromiley, P. (1991). Testing a causal model of corporate risk taking and performance. *Academy of Management journal*, *34*(1), 37-59.

Brüderl, J., Preisendörfer, P., & Ziegler, R. (1992). Survival chances of newly founded business organizations. *American sociological review*, 227-242.

Brüderl, J., & Preisendörfer, P. (1998). Network support and the success of newly founded business. *Small business economics*, *10*(3), 213-225.

Bruderl, J., & Schussler, R. (1990). Organizational Mortality: The Liabilities of Newness and Adolescence. *Administrative Science Quarterly*, *35*(3), 530-547.

Brush, C. G., Greene, P. G., & Hart, M. M. (2001). From initial idea to unique advantage: The entrepreneurial challenge of constructing a resource base. *Academy of Management Perspectives*, *15*(1), 64-78.

Burt, R. S. (1997). The contingent value of social capital. *Administrative science quarterly*, 339-365.

Burt, R. S. (2004). Structural holes and good ideas. *American journal of sociology*, *110*(2), 349-399.

Burt, R. S. (2009). *Structural holes: The social structure of competition*. Cambridge, MA: Harvard university press.

Carroll, G. R., & Hannan, M. T. (1989). Density dependence in the evolution of populations of newspaper organizations. *American sociological review*, 524-541.

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. *Financial review*, *38*(1), 33-53.

Chandler, G. N., & Hanks, S. H. (1998). An examination of the substitutability of founders human and financial capital in emerging business ventures. *Journal of business venturing*, *13*(5), 353-369.

Chua, R. Y., Roth, Y., & Lemoine, J. F. (2015). The impact of culture on creativity: How cultural tightness and cultural distance affect global innovation crowdsourcing work. *Administrative Science Quarterly*, *60*(2), 189-227.

Churchill, N., & Lewis, V. (1983). The Five Stages of Small Business Growth. *Harvard Business Review*, *61*(3), 30-50.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, *94*, S95-S120.

Colombo, M. G., & Grilli, L. (2005). Founders' human capital and the growth of new technology-based firms: A competence-based view. *Research policy*, *34*(6), 795-816.

Colombo, M. G., & Grilli, L. (2009). A capital partnership: how human and venture capital affect the growth of high-tech start-ups. *Strategic Change: Briefings in Entrepreneurial Finance*, *18*(7-8), 231-239.

Colombo, M. G., & Grilli, L. (2010). On growth drivers of high-tech start-ups: Exploring the role of founders' human capital and venture capital. *Journal of business venturing*, *25*(6), 610-626.

Cooper, A. C., Gimeno-Gascon, F. J., & Woo, C. Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of business venturing*, *9*(5), 371-395.

Cox, D. (1972). Regression Models and Life-Tables. *Journal of the Royal Statistical Society*. Series B (Methodological), *34*(2), 187-220.

Cyert, R. M., & March, J. G. (1963). A behavioral theory of the firm. *Englewood Cliffs, NJ*, *2*(4), 169-187.

Daily, C. M., & Dalton, D. R. (1992). The relationship between governance structure and corporate performance in entrepreneurial firms. *Journal of Business Venturing*, *7*(5), 375-386.

Daily, C. M., & Dalton, D. R. (1994a). Bankruptcy and corporate governance: The impact of board composition and structure. *Academy of Management journal*, *37*(6), 1603-1617.

Daily, C. M., & Dalton, D. R. (1994b). Corporate governance and the bankrupt firm: An empirical assessment. *Strategic Management Journal*, *15*(8), 643-654.

Daily, C. M., McDougall, P. P., Covin, J. G., & Dalton, D. R. (2002). Governance and strategic leadership in entrepreneurial firms. *Journal of management*, *28*(3), 387-412.

Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. (1999). Number of directors and financial performance: A meta-analysis. *Academy of Management journal*, *42*(6), 674-686.

Davidsson, P. (2004). *Researching entrepreneurship*. New York: Springer.

Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of business venturing*, *18*(3), 301-331.

Delmar, F., & Shane, S. (2004). Legitimating first: Organizing activities and the survival of new ventures. *Journal of Business Venturing*, *19*(3), 385-410.

Delmar, F., & Wiklund, J. (2008). The effect of small business managers' growth motivation on firm growth: A longitudinal study. *Entrepreneurship Theory and Practice*, *32*(3), 437-457.

Dharwadkar, B., George, G., & Brandes, P. (2000). Privatization in emerging economies: An agency theory perspective. *Academy of management review*, *25*(3), 650-669.

Dimov, D. P., & Shepherd, D. A. (2005). Human capital theory and venture capital firms: exploring "home runs" and "strike outs". *Journal of Business Venturing*, *20*(1), 1-21.

Donckels, R., & Lambrecht, J. (1995). Networks and small business growth: an explanatory model. *Small Business Economics*, *7*(4), 273-289.

Dosi, G., Marsili, O., Orsenigo, L., & Salvatore, R. (1995). Learning, market selection and the evolution of industrial structures. *Small Business Economics*, *7*(6), 411-436.

Dwyer, S., Richard, O. C., & Chadwick, K. (2003). Gender diversity in management and firm performance: The influence of growth orientation and organizational culture. *Journal of Business Research*, *56*(12), 1009-1019.

Erhardt, N. L., Werbel, J. D., & Shrader, C. B. (2003). Board of director diversity and firm financial performance. *Corporate governance: An international review*, *11*(2), 102-111.

Esenhardt, K. M., & Schoonhoven, C. B. (1990). Organisational growth: linking founding team, strategy, environment and growth among US semiconductor ventures, 1978-198. *Administrative Science Quarterly*, *35*(3), 504-529.

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The journal of law and Economics*, *26*(2), 301-325.

Feeser, H. R., & Willard, G. E. (1990). Founding strategy and performance: A comparison of high and low growth high tech firms. *Strategic management journal*, *11*(2), 87-98.

Fisher, L., & Lin, D. (1999). Time-dependent covariates in the Cox proportional-hazards regression model. *Annual Review of Public Health*, *20*, 145-57.

Florin, J., Lubatkin, M., & Schulze, W. (2003). A social capital model of high-growth ventures. *Academy of Management Journal*, *46*(3), 374-384.

Franko, L. G. (1989). Global corporate competition: Who's winning, who's losing, and the R&D factor as one reason why. *Strategic Management Journal*, *10*(5), 449-474.

Frese, M., Krauss, S. I., Keith, N., Escher, S., Grabarkiewicz, R., Luneng, S. T., ... & Friedrich, C. (2007). Business owners' action planning and its relationship to business success in three African countries. *Journal of applied psychology*, *92*(6), 1481.

George, G. (2005). Slack resources and the performance of privately held firms. *Academy of Management Journal*, *48*(4), 661-676.

George, G., Wiklund, J., & Zahra, S. A. (2005). Ownership and the internationalization of small firms. *Journal of management*, *31*(2), 210-233.

Geroski, P. A. (1995). What do we know about entry?. *International Journal of Industrial Organization*, *13*(4), 421-440.

Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative science quarterly*, 750-783.

Gimmon, E., & Levie, J. (2010). Founder's human capital, external investment, and the survival of new high-technology ventures. *Research Policy*, *39*(9), 1214-1226.

Goodstein, J., Gautam, K., & Boeker, W. (1994). The effects of board size and diversity on strategic change. *Strategic management journal*, *15*(3), 241-250.

Granovetter, M. (1973). The Strength of Weak Ties. *American Journal of Sociology*, *78*(6), 1360-1380.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic management journal*, *17*(S2), 109-122.

Greve, H. R. (2003). *Organizational learning from performance feedback: A behavioral perspective on innovation and change*. Cambridge, UK ; New York : Cambridge University Press.

Gries, T., & Naudé, W. (2010). Entrepreneurship and structural economic transformation. *Small Business Economics*, *34*(1), 13-29.

Hannan, M. (1998). Rethinking Age Dependence in Organizational Mortality: Logical Fromalizations 1. *American Journal of Sociology*, *104*(1), AJSv104p126-164.

Hillman, A. J., Cannella Jr, A. A., & Harris, I. C. (2002). Women and racial minorities in the boardroom: how do directors differ?. *Journal of management*, *28*(6), 747-763.

Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management review*, *28*(3), 383-396.

Hillman, A. J., Cannella, A. A., & Paetzold, R. L. (2000). The resource dependence role of corporate directors: Strategic adaptation of board composition in response to environmental change. *Journal of Management studies*, *37*(2), 235-256.

Hitt, M. A., Hoskisson, R. E., Johnson, R. A., & Moesel, D. D. (1996). The market for corporate control and firm innovation. *Academy of management journal*, *39*(5), 1084-1119.

Hoang, H., & Antoncic, B. (2003). Network-based research in entrepreneurship: A critical review. *Journal of business venturing*, *18*(2), 165-187.

Hunter, J. E. (1986). Cognitive ability, cognitive aptitudes, job knowledge, and job performance. *Journal of vocational behavior*, *29*(3), 340-362.

Hvide, H. K., & Møen, J. (2010). Lean and hungry or fat and content? Entrepreneurs' wealth and start-up performance. *Management Science*, *56*(8), 1242-1258.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, *76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Johannisson, B., Alexanderson, O., Nowicki, K., & Senneseth, K. (1994). Beyond anarchy and organization: entrepreneurs in contextual networks. *Entrepreneurship & Regional Development*, *6*(4), 329-356.

Levinthal, D., & March, J. G. (1981). A model of adaptive organizational search. *Journal of economic behavior & organization*, *2*(4), 307-333.

Lin, N. (2017). Building a network theory of social capital. In K. Cook & R. S. Burt (Eds.), *Social capital* (pp. 3-28). New York : Routledge.

Mahadeo, J. D., Soobaroyen, T., & Hanuman, V. O. (2012). Board composition and financial performance: Uncovering the effects of diversity in an emerging economy. *Journal of business ethics*, *105*(3), 375-388.

March, J. G. (1994). *Primer on decision making: How decisions happen*. New York : Simon and Schuster.

Marquis, C., & Tilcsik, A. (2013). Imprinting: Toward a Multilevel Theory. *The Academy of Management Annals*, *7*(1), 195-245.

Meyer, A. D. (1982). Adapting to environmental jolts. *Administrative science quarterly*, 515-537.

Milanov, H., & Fernhaber, S. A. (2009). The impact of early imprinting on the evolution of new venture networks. *Journal of Business Venturing*, *24*(1), 46-61.

Miller, T., & del Carmen Triana, M. (2009). Demographic diversity in the boardroom: Mediators of the board diversity–firm performance relationship. *Journal of Management studies*, *46*(5), 755-786.

Milliken, F. J., & Vollrath, D. A. (1991). Strategic decision-making tasks and group effectiveness: Insights from theory and research on small group performance. *Human Relations*, *44*(12), 1229-1253.

Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of'unstructured'decision processes. *Administrative science quarterly*, *21*(2).

Morbey, G. K. (1988). R&D: Its relationship to company performance. *Journal of Product Innovation Management*, *5*(3), 191-200.

Mosakowski, E. (2017). Overcoming resource disadvantages in entrepreneurial firms: When less is more. In M. A. Hitt, R. D. Ireland, S. M. Camp & D. L. Sexton (Eds.), *Strategic entrepreneurship: Creating a new mindset*, 106-126. Malden, Mass. : Blackwell.

Perroux, F. (1970). Note on the concept of growth poles. *Regional economics: theory and practice*, *93*(103).

Piazza-Georgi, B. (2002). The role of human and social capital in growth: extending our understanding. *Cambridge Journal of Economics*, *26*(4), 461-479.

Richard, O. C., Murthi, B. S., & Ismail, K. (2007). The impact of racial diversity on intermediate and long-term performance: The moderating role of environmental context. *Strategic Management Journal*, *28*(12), 1213-1233.

Roberts, E. B. (1991). *Entrepreneurs in high technology: Lessons from MIT and beyond*. New York; Oxford : Oxford University Press.

Saridakis, G., Mole, K., & Storey, D. J. (2008). New small firm survival in England. *Empirica*, *35*(1), 25-39.

Sapienza, H. J., Parhankangas, A., & Autio, E. (2004). Knowledge relatedness and post-spin-off growth. *Journal of Business Venturing*, *19*(6), 809-829.

Seibert, S. E., Kraimer, M. L., & Liden, R. C. (2001). A social capital theory of career success. *Academy of management journal*, *44*(2), 219-237.

Sexton, D. L., & Bowman, N. (1985). The entrepreneur: A capable executive and more. *Journal of business venturing*, *1*(1), 129-140.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of management review*, *25*(1), 217-226.

Sharfman, M. P., Wolf, G., Chase, R. B., & Tansik, D. A. (1988). Antecedents of organizational slack. *Academy of Management review*, *13*(4), 601-614.

Shepperd, J. A. (1993). Productivity loss in performance groups: A motivation analysis. *Psychological bulletin*, *113*(1), 67.

Shrader, C., Blackburn, V., & Iles, P. (1997). Women in management and firm financial performance: An exploratory study. *Journal of Managerial Issues*, *9*(3), 355-372.

Siciliano, J. I. (1996). The relationship of board member diversity to organizational performance. *Journal of Business Ethics*, *15*(12), 1313-1320.

Singley, M. K., & Anderson, J. R. (1989). *The transfer of cognitive skill* (No. 9). Cambridge, Massachusetts; London, England : Harvard University Press.

Smeltzer, L. R., Van Hook, B. L., & Hutt, R. W. (1991). Analysis of the use of advisors as information sources in venture startups. *Journal of Small Business Management*, *29*(3), 10.

Sonnentag, S. (1998). Expertise in professional software design: A process study. *Journal of applied psychology*, *83*(5), 703.

Spence, A. M. (1974). *Market signaling: Informational transfer in hiring and related screening processes* (Vol. 143). Harvard Univ Pr.

Starr, J. A., & MacMillan, I. C. (1990). Resource cooptation via social contracting: Resource acquisition strategies for new ventures. *Strategic Management Journal*, 79-92.

Stinchcombe, A. (1965). Social Structure and Organizations. *Handbook of Organizations*, 142-193.

Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative science quarterly*, *44*(2), 315-349.

Swaminathan, A. (1996). Environmental conditions at founding and organizational mortality: A trial-by-fire model. *Academy of Management Journal*, *39*(5), 1350.

Tan, J., & Peng, M. W. (2003). Organizational slack and firm performance during economic transitions: Two studies from an emerging economy. *Strategic management journal*, *24*(13), 1249-1263.

Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of business venturing*, *26*(3), 341-358.

Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *American sociological review*, 674-698.

Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative science quarterly*, 35-67.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, *5*(2), 171-180.