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ABSTRACT

ENTREPRENEURSHIP AND HETEROGENEITY AMONG FIRMS' STRATEGIES: THREE ESSAYS

by
Xi Zhang

The first essay of this dissertation focuses on the entrepreneurship survival in the early stage, during which time an entrepreneur plays the game at the “edge of chaos” and improvises in real-time to learn the strategic playing field. It examines the social networks of entrepreneurs and the impact on new venture survival. Specifically, it explores how the entrepreneurs’ social connections with other entrepreneurs and their types of employment differentially affect survival during the different stages of the entrepreneurial journey in the United States and India. Using the Global Entrepreneurship Monitor (GEM) dataset, this study documents not only how the social connections differentially impact survival in the U.S. and India during the early and later stages, but also the differences between the importance of full-time and hybrid entrepreneurship across regions. It thus sheds light on the challenges faced by early-stage entrepreneurship in both developed and developing economies, as well as the effect of these differences on venture survival. Implications for theory and practice are discussed.

The second essay looks at growth of entrepreneurial ventures. Despite prior entrepreneurship research highlighting the role of access to resources, the experience of founders, and new ventures’ innovation in a startup’s growth, researchers are yet to explore how some startups achieve unicorn status, i.e., get to a one-billion dollar in valuation. This study examines how the founders’ prior entrepreneurial experience, the venture’s intellectual property (IP), and access to corporate venture capital (CVC) influence a

startup's likelihood of becoming a unicorn venture. It is found that IP partially mediates the relationship between the founders' prior entrepreneurial experience and the likelihood of becoming a unicorn venture and that the presence of CVC investors negatively moderates the effect of founders' prior entrepreneurial experience on the venture's IP. Surprisingly, the results suggest that the presence of CVC does not impact the relationship between founders' prior entrepreneurial experience and the likelihood of becoming a unicorn venture. Implications for the theory and practice of entrepreneurship are discussed.

The third essay investigates how a unicorn venture's strategic decisions regarding diversification and acquisition affect its likelihood of an IPO and how these relationships can vary depending on firm age. Using data on unicorn ventures founded in the United States between 1983 and 2021, this study finds that a unicorn venture's likelihood of an IPO has an inverted-U relationship with its age. It is also revealed that younger unicorn ventures are more likely to go public with less diversification and more acquisitions, whereas older unicorn ventures are more likely to go public with greater diversification and fewer acquisitions. The findings suggest that unicorn ventures have a window of opportunity to go public. This work contributes to both entrepreneurship literature and population ecology research by bringing the two literature together to explore how firm age and ventures' strategic decisions influence the IPO exit of a unicorn venture.

**ENTREPRENEURSHIP AND HETEROGENEITY AMONG FIRMS'
STRATEGIES: THREE ESSAYS**

by
Xi Zhang

**A Dissertation
Submitted to the Faculty of
New Jersey Institute of Technology
in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy in Business Data Science**

Martin Tuchman School of Management

May 2022

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APPROVAL PAGE

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CHAPTER 1

INTRODUCTION

The entrepreneurship literature has long established that social learning, which occurs through interactions with others, is fundamental to the identification and exploitation of entrepreneurial opportunities (Klyver et al., 2008). Recent studies uncover that entrepreneurs leverage different social ties to gather ideas and information to recognize entrepreneurial opportunities and start new businesses (Anderson et al., 2007). Despite these investigations, the contingent role of institutional context is somewhat overlooked. Given that the national structures shape the range of options available to an entrepreneur as well as the perceived costs and benefits (Baker et al., 2005), the opportunity costs of being an entrepreneur are also largely context-dependent. Researchers have noted that there has been an explosion of hybrid entrepreneurs, who engage in a new venture while simultaneously pursuing paid employment elsewhere (Folta et al., 2010, Grant, 2011). The first essay (Chapter 2) of my dissertation seeks to understand how the combination of social connections, individual commitment and national structure jointly drive new venture activities in a single framework, and whether the factors (i.e., social connections with other entrepreneurs and employment status) that impact survival different from an early-stage venture to a later-stage one.

The second essay (Chapter 3) looks at the creation of unicorn ventures, i.e., entrepreneurial ventures get to a one-billion-dollar valuation. Despite the considerable attention devoted to studying the determinants of entrepreneurial firm growth (McKelvie & Wiklund, 2010), researchers have yet to identify the antecedents to the creation of unicorn ventures. Following Alvarez and Barney (2007), we focus on the founders' prior

entrepreneurial experience as one of the antecedents to a new venture creation (Corbett, 2007). Additionally, extant research notes that intellectual property (IP) also plays a critical role in a new entrepreneurial firm's performance (Katila & Ahuja, 2002). More recently, studies have demonstrated that given the severe resource constraints faced by entrepreneurial firms, CVC partnerships may help create and capture value (Wadhwa & Basu, 2013). In this study, we borrow insights from the extant strategy and entrepreneurship literature and investigate how the firm-level resource heterogeneity of startups —the founder's prior entrepreneurial experience, possession of the intellectual property, and connection to the CVC— affect their propensity to become a new unicorn venture.

The third essay (Chapter 4) explores the antecedents of the IPO exit of unicorn ventures and the role of firm age. Despite the importance of firm age in the pursuit of firm strategy, most studies in the strategic entrepreneurship literature restrict the analysis of firm age to simply understanding its impact on firm survival. They primarily concentrate on the liability of newness, implying that younger entrepreneurial firms lack trust in existing relationships, social capital, and economic capital (Morse et al., 2007). The question of how firm age influences the exit of a unicorn startup remains unanswered. This essay seeks to extend researchers' understanding of the performance of unicorn ventures and further the extant IPO literature by considering age-related factors that impact the process by which a venture gets to an initial public offering after it has received the unicorn status.

CHAPTER 2

IMPACT OF ENTREPRENEURS’ FULL-TIME VS HYBRID EMPLOYMENT AND SOCIAL CONNECTIONS ON NEW VENTURE SURVIVAL: A US-INDIA COMPARISON

2.1 Introduction

By investigating entrepreneurship as an evolutionary process (Alvarez and Barney, 2007, Shepherd, 2015), researchers have emphasized that one of the persistent challenges that entrepreneurs face is surviving the early stage of a venture’s formation (Agarwal et al., 2017)—the period when an entrepreneur’s activities are often “chaotic, unpredictable, and unstructured” (Mugge and Markham, 2013). During the early stages, entrepreneurs use their social connections to nurture the venture with an informal body of stakeholders that have a shared interest in the potential opportunity embodied in the new venture (Shepherd et al., 2020). Notably, having an entrepreneurial peer group positively affects an entrepreneur’s intentions in the early stage as the entrepreneur’s attitudes and intentions to become self-employed are seen to increase (Souitaris et al., 2007). Despite these investigations, the contingent role of institutional context is somewhat overlooked. The oversight is significant because the impact of an entrepreneur’s social connections cannot be considered in isolation from the context in which the social network exists (De Clercq et al., 2013), and researchers have noted that the role of entrepreneurs’ social capital is contingent on the specific financial, education, and political systems with which they must contend (Sahasranamam and Nandakumar, 2020).

Given that the national structures shape the range of options available to an entrepreneur as well as the perceived costs and benefits (Baker et al., 2005), the opportunity costs of being an entrepreneur are also largely context-dependent. Researchers have noted

that there has been an explosion of hybrid entrepreneurs, who engage in a new venture while simultaneously pursuing paid employment elsewhere (Folta et al., 2010, Grant, 2011). Recent research highlights the extent to which resources invested by an entrepreneur impact survival of the venture; individuals are involved in varying degrees from being full-time entrepreneurs to working full-time elsewhere and being peripherally involved in the new venture. (Raffiee and Feng, 2013). Until now, little attention has been devoted to how the combination of social connections, individual commitment and national structure jointly drive new venture activities in a single framework. Furthermore, the literature also found that entrepreneurs, irrespective of their extent of commitment, in the early and later stages confront different drivers of entrepreneurial success (Shane and Venkataraman, 2013). On the one hand, in the early stage, entrepreneurs concentrate their efforts on market discovery and evolution, as well as concept creation (Khurana and Rosenthal, 1998). On the other hand, in the later stage, the emphasis turns to product commercialization and market scaling up (Cooper and Kleinschmidt, 1988). This motivates us to seek the answers to the following research questions:

- (i) *“How do the hybrid and full-time entrepreneurs’ social connections with other entrepreneurs differentially affect the survival of their nascent firm in the U.S. and India?”*
- (ii) *“Are the factors (i.e., social connections with other entrepreneurs and employment status) that impact survival different from an early-stage venture to a later-stage one in both countries?”*

To answer our research questions we use the GEM database, which has helped in understanding differences in entrepreneurial activity across different countries (Reynolds et al., 2005). We focus on the two countries U.S. and India—the third and fourth-largest economies in the world in terms of Purchasing Power Parity – and both countries have a vibrant entrepreneurial culture. An European Commission (2013) report notes that in

developed economies, such as U.S., that have a robust social security system, stable salaries, health insurance plans, entrepreneurs are reluctant to leave their wage paying jobs, and choose to be hybrid entrepreneurs instead of full-time entrepreneurs. By contrast, in the developing economies, such as India, where individuals experience difficulty getting full-time employment or face labor market discrimination (Ito, 2009), entrepreneurs use self-employment to supplement their earnings (Gindling and Newhouse, 2012). We hypothesized and found that in the early stages, social connections with other entrepreneurs and being a full-time employee elsewhere favor the survival of the entrepreneur's business in the U.S.; while being self-employed favorably impacts the survival in India.

We also notice that factors that impact survival in the later stage are different when compared to the early stage in U.S. and India. Our results suggest that, in the U.S., when the firm's management becomes more efficiency-driven because of VC's intervention in the later stages, the focus tends to be more internally driven. In contrast, Indian firms continue to use their social connections to cross over from government funding to other sources of funds. Consequently, the policy choices that are relevant in the U.S. may not be as critical in India.

Taken together, our research expands the recent effort of researchers to explore entrepreneurship through the dynamic lens and extends the literature by merging the wisdom received from Agarwal et al. (2017) with recent insights of the role of social capital (Scillitoe and Birasnav, 2021). In doing so, we not only contribute to the entrepreneurship literature, but also to the international business literature which has strived to explore the effect of country-level differences on entrepreneurship and innovation.

2.2 Literature Review

2.2.1 Entrepreneurship as a Social Process

The entrepreneurship literature has long established that social learning, which occurs through interactions with others, is fundamental to the identification and exploitation of entrepreneurial opportunities (Klyver et al., 2008). Recent studies uncover that entrepreneurs leverage different types of social ties to gather ideas and information to recognize entrepreneurial opportunities and start new businesses (Anderson et al., 2007). Besides, entrepreneurs rely on social connections to gain access to partners, suppliers, potential customers, angel investors, and venture capitalists to get critical information and resources—that affect the performance of the new firm (Stuart, 2000, Hsu and Lim, 2013).

An entrepreneur's social connections can provide both tangible and intangible resources, (Coleman, 1988, Granovetter, 1985) and facilitate information brokering, and arbitration (Burt, 2004). For example, an entrepreneur may use social relationships with venture capitalists and professional advisors as a mechanism to seek talent, new ideas, and market information (Ozgen and Baron, 2007, Hoang and Yi, 2015, Hoang and Antoncic, 2003). Moreover, experienced entrepreneurs can offer guidance and legitimization scripts for nascent entrepreneurs (Pryor et al., 2016), and can reinforce entrepreneurs' identities (Nicolaou and Birley, 2003) by providing access to role models (Kacperczyk, 2013, Nanda and Sørensen, 2010) enhancing the persistence to remain in the business (Gimeno et al., 1997).

The social connection of entrepreneurs contributes to information exchange and the rapid diffusion of novel ideas and techniques, not only among manufacturers and service providers in the developed economies (Holbrook et al., 2000) but also in developing

economies (Opper and Nee, 2015), leading to social learning among entrepreneurs. In a corporate environment, employees are more likely to be exposed to new knowledge (Cohen and Levinthal, 1990, Agarwal et al., 2010) particularly through knowledge spillovers¹ through the movement of people. Such a phenomenon is perhaps less common in a startup setting. Research suggests that entrepreneurs who avoid social isolation through interactions with peers, informal support networks, mentors and partners generally outperform their peers (Galloway et al., 2021).

2.2.2 Hybrid Entrepreneurship Versus Full-time Entrepreneurship

Entrepreneurs may be employed full time in their start-ups, or alternatively working elsewhere and also be involved in their start-ups; such involvement is labeled hybrid entrepreneurship. Petrova (2012) noted that social capital is critical for hybrid entrepreneurs and that, entrepreneurs who are full-time employed elsewhere have higher social capital, level of confidence, and access to financial resources.

In fact, hybrid entrepreneurs account for a significant and increasing percentage of entrepreneurial activities (Burke et al., 2008). Recent anecdotal evidence highlights that hybrid entrepreneurs enjoy the income and financial stability that self-employed entrepreneurs often lack². Compared to full-time entrepreneurs, hybrid entrepreneurs are less likely to completely burn through savings “while figuring out the viability of the business” (Fastcompany.com; November 30, 2016). Similarly, Folta *et al.* (2010) noted that high-wage earners and individuals with high switching costs are more likely to become hybrid entrepreneurs. In the U.S., “73% of the founders of startup businesses make \$50,000

¹ “Solopreneurship and Thriving in the Gig Economy”, retrieved on June 2020, available at <https://www.entrepreneur.com/article/331635>

² “Why we need to be honest about the risks of entrepreneurship”, retrieved on November 2018, available at <https://www.fastcompany.com/90260337/the-risks-of-starting-a-new-business-without-a-safety-net>

per year or less" (Business Insider report, April 2016)—implying that in the U.S. entrepreneurs who are not full-time employed elsewhere run the risk of "ruining their finances."

Recently, scholars highlight the implications of hybrid entrepreneurship on entrepreneurial performance. Schulz *et al.* (2016) suggests that highly educated hybrid entrepreneurs use the ventures to explore business opportunities and are more likely to respond quickly to institutional changes than full-time entrepreneurs. Building on the work of Folta *et al.* (2010), researchers note that hybrid entrepreneurs who successively become full-time entrepreneurs tend to have much higher survival rates relative to the individual who enters full-time entrepreneurship straight from full-time employment (Raffiee and Feng, 2013).

2.2.3 New Venture Survival and Regional Support

Studies exploring the evolution of new ventures often use survival to measure success (Nassereddine, 2012). However, little attention has been devoted to comparing the challenges faced by the entrepreneurs—both full-time and hybrid-- in developed and developing economies in different stages of a new venture. Reynolds (2010) examines the stages of the new venture creation process and noted that subsequent to “firm birth” (Katz and Gartner, 1988), a nascent entrepreneur evolves into an owner-manager who turns business ideas into prototypes and develops them into an operational business—thereby entering the early stage of the entrepreneurial process. Once their entrepreneurial firms have paid salaries and wages for more than 3.5 years, they have survived the “liability of newness” and transition to the later stage of the entrepreneurial process (Reynolds et al., 2005). Given that startups often lack the necessary in-house resources to bring new

products and services to the market in a profitable and scalable fashion (Furr and Kapoor, 2018), to reach the stage of value appropriation, they require external resources, including debt financing (e.g., loans), equity financing (e.g., angel investors and venture capital), and crowdfunding (Leach and Melicher, 2014). These factors, however, vary significantly across geographies.

Entrepreneurs in the U.S. have access to a wide range of services, from educational opportunities to advanced strategizing from institutions, such as the Ewing Marion Kauffman Foundation. However, entrepreneurs in India often lack the organized sources of venture funding and consequently rely on subsidized sources, such as the financing schemes offered by the Central Government of India and the World Bank Group's InfoDev. To address the trade-offs, where the banks lack the incentive to finance most early startups, and the amounts available through microfinance are often inadequate for an entrepreneur's requirements, a few innovative solutions have been devised by the social support organizations, leading to "an alternative to the traditional financial sector" (Sonne, 2012).

In comparison to the U.S., the 21st century India is a younger country with more than 54 percent of its total population below 25 years of age (GEM, 2017). During the past decade, the Indian government has taken more proactive approaches to enhancing innovative capacity and facilitating entrepreneurial activities, with the goal of transforming young people into full-time entrepreneurs³. Thus, total entrepreneurship activity (TEA) rates in India was found to be high among the younger age groups of 18-44 years in 2015 - 2016 (GEM, 2017). Unlike India, where there is a tradeoff between TEA and entrepreneurial employee activity (EEA) rates, the U.S. is one of the economies where both

³ "Decade of Innovation: 2010-2020 Roadmap", National Innovation Council, retrieved on April 2021, available at www.innovationcouncil.gov.in

TEA and EEA rates are high (GEM, 2016), implying that hybrid entrepreneurs are one of the main forces of entrepreneurship in the U.S. Not surprisingly, Prabhu and Jain (2015) note that entrepreneurs in Indian contexts tend to develop solutions for communities that have traditionally been underserved, while those in developed economies attempt to push the technology frontier and target at premium customers. These facts further strengthen the notion that entrepreneurs in different contexts differ not only in how they gather and structure resources, but also in how they utilize resources to conduct entrepreneurial activities. As a result, the underlying mechanisms of nascent firm survival are likely to vary across countries.

2.3 Theory and Hypotheses

2.3.1 Effect of the Social Connection of Entrepreneurs

Social connections assist nascent entrepreneurs by exposing them to innovative ideas and international views, supplying them with a broader frame of reference that is both supportive and nurturing to the early-stage ventures (Aldrich and Kim, 2007). Specifically, information brokerage (i.e., the individual or information that may link the entrepreneur with access to knowledge or resources) within the entrepreneur's social network can be critical for the development of an early-stage venture, because brokerage throughout the entrepreneurial community delivers valuable insights for opportunity recognition and development that would otherwise go unnoticed which is how information brokerage generates social capital for entrepreneurs.

In the later stages of an entrepreneurial venture, social capital becomes important in aiding the entrepreneurial exploitation process by facilitating the evaluation, procurement, and utilization of resources (Aldrich and Zimmer, 1986). In other words,

access to critical information and resources embedded in the entrepreneur's social network could be more crucial for venture sustainability than for information brokerage. In particular, social capital, when properly leveraged, can be important in environments with insufficient support systems and/or a weak economies (Leff, 1979).

Information brokerage from social connections with other entrepreneurs is considered more important in the U.S. entrepreneurial ecosystem, given the mature entrepreneurial environment and the disproportionate importance of entrepreneurship communities in the U.S. when compared to India (approximately 1500 incubators vs. 140 incubators, respectively⁴). Directly and implicitly, networking in the entrepreneur community provides information to gain access to diversified information and resources for new ventures (Peters et al., 2004). Unlike professional advising and mentoring partnerships, which mostly assist entrepreneurs in handling financial risk, peer advising offers entrepreneurs with guidance, inspiration, and new insights from individuals who have faced similar pain points, and therefore could possibly assist entrepreneurs in managing psychological risk and social risk (Folta, 2007). The information brokerage, in the U.S., which is an entrepreneur's social connection with other entrepreneurs plays a more critical role in the early stage of the new business, and this effect is likely to diminish in the later stage, when startups depend heavily on guidance and support from the board members and other investors (Sullivan and Ford, 2014).

However, an entrepreneur's social connection plays a more critical role in risk mitigation rather than information brokerage for the later-stage ventures in India. Given that the Indian government provides less support in terms of resources and social safety

⁴ "E-comparison: the U.S. vs. Indian Startup Ecosystem". Retrieved from:
<https://www.tandongroup.com/2018/03/07/ecomparison-us-vs-indian-startup-ecosystem/>

nets both in absolute terms and per capita amounts(Ito, 2009, Baker et al., 2005), social networks help startups by providing critical information and resources (Coleman, 1988), such as professional advice and financial capital that would otherwise be unavailable or costly to locate. Embedded resources are more critical for Indian entrepreneurs in the later stage, because the success of later-stage ventures in the U.S. are largely dependent on creating customer loyalty with patient investors, whereas the business culture in India has a lower tolerance for founder's missteps, so companies do not have time to prove their value proposition and test products extensively⁵ and many business decisions were based on social connections and prior relationships, rather than the actual business function itself⁶. Consistent with Panda (2015) and Morris *et al.* (2006), we expect entrepreneurs in India are likely to rely on social connections with other entrepreneurs to forge relations in the later stage of their ventures to get access to the suppliers of raw materials as well as to establish contacts with new customers to increase market share after the early stage. This discussion leads to the following hypotheses.

H1a: An entrepreneur's social connections with other entrepreneurs will have a lower effect on the chance of survival of early-stage entrepreneurial activity in India as compared to the U.S.

H1b: An entrepreneur's social connections with other entrepreneurs will have a higher effect on the chance of survival of later-stage entrepreneurial activity in India as compared to the U.S.

2.3.2 Effect of Hybrid and Full-time Entrepreneurship

The hybrid approach allows entrepreneurs to start a new venture on a smaller scale with lower sunk costs and a lower downside risk (Folta et al., 2010). Consequently, hybrid

⁵ Ajay Yadav, "How Startup Culture in India Differs from The U.S.," 2016, retrieved from: <https://www.forbes.com/sites/ajayyadav/2016/08/18/how-startup-culture-in-india-differs-from-the-u-s/?sh=cdb7873bedb6>

⁶ AJ Agrawal, "The Difference between Entrepreneurship in India and in the U.S.," 2016, retrieved from: <https://www.inc.com/aj-agrawal/the-differences-of-entrepreneurship-in-india-compared-to-the-u-s.html>

entrepreneurs will enter full-time entrepreneurship only when they perceive that option to be lucrative (O'Brien et al., 2003). During the option period, hybrid entrepreneurs benefit from learning about the potential of their business idea, their entrepreneurial skills, and the fit within the entrepreneurial context (Raffiee and Feng, 2013), thereby reducing the risk of new venture failure in the early stages.

In developed economies, hybrid entrepreneurs use new ventures to explore business opportunities and test ideas (Schulz et al., 2016). On the other hand, in India, rural entrepreneurship constitutes the dominant form of entrepreneurial activity (Acharya et al., 2007). We contend that in the early stage, the opportunity costs (such as the risks of bankruptcy due to medical emergencies) of being a fully self-employed entrepreneur is much higher in the U.S. than in India. As a result, it's more critical to "test the waters" prior to fully committing to the new venture in the U.S.

In the early stage, considering the high levels of bureaucracy in India, hybrid entrepreneurs (i.e., entrepreneurs with full-time employment elsewhere) are more likely to forego vital activities that are necessary to navigate the bureaucratic hurdles to raise money from governmental sources (Luo and Junkunc, 2008). Consistently, Naudé (2010) noted that when compared to the developed economies, the "startup rates, self-employment, and opportunity for entrepreneurship are all much higher in India." Not surprisingly, Kodithuwakku and Rosa's (2002) study of Sri Lankan farmers underscored that successful self-employed farmer-entrepreneurs had converted their labor into "income-generating activities." Consequently, we argue that in the early stage, the lack of other options to enable their business to survive would induce more self-employed entrepreneurs in India as compared to the U.S.

For later-stage ventures, however, we do not expect much difference in the impact of hybrid and full-time entrepreneurship between India and the U.S. In the U.S., the pressure that entrepreneurs face to be employed elsewhere for health and other benefits is likely to decrease because of funding from the venture capitalists, thus, the entrepreneurs are able to shift all financial risk to other actors (i.e., the investors) in the later stage. In India, employment elsewhere would reduce entrepreneurs' flexibility, which is crucial to managing the uncertainty and volatility they constantly experience in their business environment (Prabhu and Jain, 2015). Hybrid entrepreneurs who have survived the early stage are more likely to increase commitment in the later stage as the pressure to scale up and increase efficiency will make it more critical for the entrepreneur to be self-employed in the startup. The following hypotheses regarding the impact of hybrid and full-time entrepreneur are proposed:

H2a: Hybrid entrepreneurs will have a lower chance of survival of early-stage entrepreneurial activity in India as compared to the U.S.

H2b: Full-time entrepreneurs will have a higher chance of survival of early-stage entrepreneurial activity in India as compared to the U.S.

H2c: Hybrid entrepreneurs will have a similar chance of survival of later-stage entrepreneurial activity in India as compared to the U.S.

H2d: Full-time entrepreneurs will have a similar chance of survival of later-stage entrepreneurial activity in India as compared to the U.S.

Taken together, our hypotheses explore how an entrepreneur's strategic choices—social connection with other entrepreneurs and hybrid vs. full-time approach – affect the new venture's ability to survive the early stage and after in India and the U.S. The conceptual model of our theory is shown in Figure 2.1.

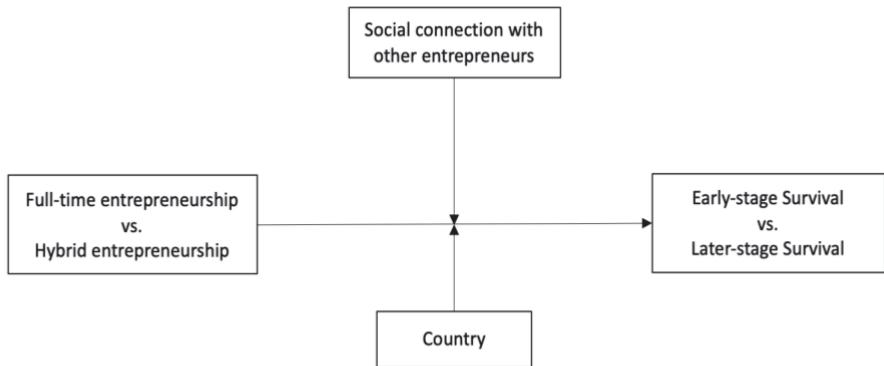


Figure 2.1 Conceptual Model of Entrepreneurial Venture Survival

2.4 Research Method

2.4.1 Data and Sample

GEM is a global research source that collects data on entrepreneurship directly from individual entrepreneurs. It is a representative and valid survey to measure and examine entrepreneurial attitudes, abilities, aspirations, activities, and influential factors across countries in a uniform fashion. GEM's Adult Population Survey (APS) provides an analysis of the characteristics, motivations, and ambitions of individuals starting businesses, as well as social attitudes towards entrepreneurship.

The data for this study were obtained from the APS of the GEM database between the years 2012 and 2014. This time period is appropriate for our study because it was the period of economic prosperity for both India and the U.S., during which the U.S. economy had expanded from about \$16 trillion to about \$17.5 trillion in that period, and the Indian economy had expanded from about \$1.84 trillion to \$2.1 trillion in the same period. The GEM data looks at the country context of 89 countries, and the entrepreneurial behavior

and attitudes of individuals across these countries. From the adult population survey, we downloaded data for 23573 respondents.

2.4.2 Operationalization of Variables

The dependent, independent, and control variables were extracted from the APS (Adult population survey). We used 14513 responses from the U.S. and 9060 from India.

Dependent Variable

Entrepreneurial firm survival. The GEM methodology is designed to capture both early-stage entrepreneurship and later-stage entrepreneurship (Reynolds et al., 2005), distinguishing between owner-managers of early-stage business (under 3.5 years) and owner-managers of later-stage entrepreneurship (3.5 years and older). Our two dependent variables extracted from the GEM database are measures of entrepreneurial survival for early-stage entrepreneurship and later-stage entrepreneurship, respectively.

Measuring entrepreneurial survival by ownership of existing startup businesses carries the risk of underestimating the overall survival rate, as the owner and the manager of some startups are not the same person. Nevertheless, the measurement reflects an essential aspect of entrepreneurship survival. Besides, in the context of building an estimable formal model, the focus on entrepreneurial survival alleviates endogeneity problems that are difficult to overcome in the context of survey data.

Independent variables

Social connections with entrepreneurs. We measured social connection as connections among the entrepreneurs. This variable is dichotomous and is derived from the question: “Do you know somebody that has started a new business in the past two years?” This term

was coded “1” for when they answered “yes,” which implied that they had social connections with other entrepreneurs and “0” for when they did not know anyone that had started a business. Other recent entrepreneurship literature that has used the GEM social connection variables include Urbano and Turró (2013) (social connection as a capability increase likelihood of becoming corporate entrepreneurs), Estrin *et al.* (2013) (knowing other entrepreneurs increases the likelihood of individual commercial entry), and Tripopsakul (2017) (personally knowing other entrepreneurs generates positive attitudes toward entrepreneurs).

Hybrid entrepreneur and full-time entrepreneur. We also examine the implications of hybrid entrepreneur and full-time entrepreneur for the Entrepreneurial Firm Survival⁷. We adopt two variables from GEM to define whether the respondent is a *hybrid entrepreneur* (employed by others in full-time work) or a *full-time entrepreneur* (fully self-employed). Both variables were coded as “1” for yes and “0” for no. The most critical impact of work and career effects would seem to be on the successful long-term operation and survival of the new firm, rather than a decision to become involved with a startup (Reynolds, 2010).

Country. We also included *country* as an independent variable to test differences between the U.S. and India. *Country* was considered was coded “0” for the United States and “1” for India. *Country* was also a moderator in the analysis.

Control variables

⁷ We decided not to include part-time employment in our estimations. Because the individuals who work two part-time jobs at the same time might face short-term problems in one of the two employment and look for complementary income for a certain period of time, that would make the determinants of survival of those individuals different from the determinants of others. We suggest, therefore, that part-time employment needs to be independently examined.

Since we used data between 2012 and 2014, we controlled for the *Year 2012* and *Year 2013*, using dummies ("1" for true and "0" for false). We also controlled demographic variables such as *Gender*, *Age range*, *Education level*, and *Income level*, to reduce unobserved heterogeneity given that we have heterogeneous multi-level data points. The *Education level*, *Income level*, and *Age range* had multiple category ranges, where a higher number represented a higher level or range. *Gender* was coded as a dummy variable ("1" for males and "0" for females).

2.4.3 Analytical procedures

After considering several alternatives, we apply the logistic regression model (Hosmer et al., 2013) to test our hypotheses. The binary logistic regression is appropriate for obtaining causal inference when the dependent variable is dichotomous (Long, 1997). Four models were used. Our baseline model used just the control variables - *Year 12*, *Year 13*, *Gender*, *Age Range*, *Education Range*, and *Income Levels*. In Model 2, we included the three independent variables – *Social connections with entrepreneurs*, *Hybrid entrepreneur*, and *Full-time entrepreneur*. In Model 3, we included the moderator variable - *Country* (the U.S. versus India). In the final model (Model 4), we used the three interaction terms - *Country*Social connections with entrepreneurs*, *Country * Hybrid entrepreneur*, and *Country * Full-time entrepreneur*.

2.4.4 Results

Table 2.1 provides the descriptive statistics of the variables and the correlations among the study variables. The dependent variables have skewed distribution; their means 0.03 (early-stage entrepreneurship) and 0.07 (later-stage entrepreneurship) are the average survival

scores of firms in India and the U.S. The low survival rate identified here is consistent with previous studies of entrepreneurship (Bednarzik, 2000). The percentages of entrepreneurs who have social connections with other entrepreneurs who started a business in the last two years are 26% in the U.S. and 27% in India, with an average of 26% for both countries. U.S. entrepreneurs have a higher ratio of being hybrid entrepreneurs (0.40), compared with India's hybrid entrepreneur ratio (0.24), but their full-time entrepreneur ratios are about the same (0.13). Male respondents and female respondents are almost equally distributed in our data sample. The average age range is 35 to 50 years, which is a typical age of entrepreneurs when they start their business (Azoulay et al., 2018). The majority of the respondents have at least a secondary degree of education.

Tables 2.2 and 2.3 present the results of the logistic regression analysis. The dependent variable in Table 2.2 is "Early-stage entrepreneurship survival," and in Table 2.3, it is "Later-stage entrepreneurship survival." An analysis of Table 2.2 shows *Gender*, *Age Range*, *Education Level*, and *Income Level* are all significant in Model 1. Younger males, of higher education, and income levels tend to be associated with firm Survival in the early stage. After the early stage, the education variable is not significant. When the independent variables are introduced in Model 2, the block Chi-square increased to 1161.13 and 2722.24 respectively; and the Cox and Snell R² was 0.06 and 0.15 for the early stage and the later stages. *Social connections with entrepreneurs*, *Hybrid entrepreneur*, and *Full-time entrepreneur* all significantly improved the chances of survival of the entrepreneurial firms both in the early and late stages. Next, we introduced *Country* as a variable and it was significant ($\beta = -0.62$, $p < 0.001$, Early-stage entrepreneurship) ($\beta = -$

0.28, $p < 0.01$, Later-stage entrepreneurship). The negative coefficient is indicative that both early-stage and later-stage stages firms in the U.S. were more likely to survive than in India.

Table 2.1 Descriptive Statistics and Correlation

Variable	Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11
1. Entrepreneurial Firm Survival up to 42 months	.03	.17											
2. Entrepreneurial Firm Survival over 42 months	.07	.247		-.031**									
3. Year 2012	.35	.48	-.025**	-.025**									
4. Year 2013	.37	.483	.022**	.052**	-.561**								
5. Gender	.49	.500	.045**	.083**	-.001	-.004							
6. Age Range	4.37	1.618	-.022**	.102**	.027**	.078**	-.055**						
7. Education Level	2.35	1.053	.037**	.053**	.065**	.021**	.050**	.095**					
8. Income Level	2.03	.832	.055**	.085**	-.017*	.033**	.075**	.008	.306**				
9. Social connections with entrepreneurs (SCE)	.26	.439	.167**	.107**	-.040**	.041**	.104**	-.075**	.066**	.099**			
10. Hybrid entrepreneur	.34	.473	-.035**	-.091**	.025**	-.058**	.214**	-.115**	.153**	.202**	.044**		
11. Full-time entrepreneur	.13	.340	.263**	.473**	.017**	.027**	.123**	.051**	.005	.029**	.196**	-.281**	
12. Country	.38	.486	-.030**	-.061**	-.086**	-.062**	0.008	-.374**	-.333**	-.054**	0.011	-.158**	-.002

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

In the final model (Model 4), we ran the interaction terms. We present the results for Early-stage entrepreneurship (Table 2.2) and Later-stage entrepreneurship (Table 2.3). Hypothesis 1a that stated that an entrepreneur's social connections with other entrepreneurs would have a lower effect on the chance of survival of early-stage entrepreneurial activity in India as compared to the U.S. was fully supported (Table 2.2, Model 4, $\beta = -1.07$, $p < 0.001$). Hypothesis 1b that stated that an entrepreneur's social connections with other entrepreneurs would have a higher effect on the chance of survival of later-stage entrepreneurial activity in India as compared to the U.S. was also supported (Table 2.3, Model 4, $\beta = 0.88$, $p < 0.001$). Thus, our investigation revealed that an entrepreneur's social connections favor the survival of the focal entrepreneur's early-stage business in the U.S. and are more critical for the later-stage entrepreneurship survival in India.

Table 2.2 Logistic Regression Models for Early-stage Survival

	Model1a		Model 2a		Model 3a		Model 4a	
Variable	Beta	s.e.	Beta	s.e.	Beta	s.e.	Beta	s.e.
Year 2012	-0.28**	0.11	-0.50***	0.11	-0.53***	0.11	-0.58***	0.11
Year 2013	0.08	0.10	-0.18	0.11	-0.15	0.11	-0.18	0.11
Gender	0.49***	0.08	-0.04	0.09	0.04	0.09	0.05	0.09
Age range	-0.07**	0.03	-0.12***	0.03	-0.17***	0.03	-0.15***	0.03
Education Level	0.15***	0.04	0.19***	0.05	0.10*	0.05	0.11*	0.05
Income Level	0.31***	0.05	0.20***	0.06	0.20***	0.06	0.19***	0.06
Social connections with entrepreneur	(SCE)		1.25***	0.09	1.26***	0.09	1.59***	0.12
Hybrid entrepreneur			0.96***	0.15	0.81***	0.15	0.86***	0.18
Full-time entrepreneur			2.97***	0.14	2.91***	0.14	2.65***	0.18
Country					-0.62***	0.11	-0.32	0.27
Country * SCE	H1a						-1.07***	0.20
Country * Hybrid	H2a						-1.00*	0.42
Country * Full-time	H2b						0.77**	0.29
Constant	-4.41***	0.19	-5.57***	0.22	-4.86***	0.25	-5.04***	0.27
Block chi-square	129.00		1162.13		34.98		59.60	
Model chi-square	129.00		1291.13		1326.11		1385.70	
Cox and Snell R-squared	0.006		0.062		0.064		0.066	

*:p<0.05; **: p<0.01; ***: p<0.001. (N= 23573; 14513- U.S., 9060- India)

Then, hypothesis 2a stated that hybrid entrepreneurs would have a lower chance of survival of early-stage entrepreneurial activity in India as compared to the U.S. was also fully supported (Table 2.2, Model 4, $\beta = -1.00$, $p < 0.05$). Finally, Hypothesis 2.3 that full-time entrepreneurs will have a higher chance of survival of early-stage entrepreneurial activity in India as compared to the U.S. was also fully supported (Table 2.2, Model 4, $\beta = 0.77$, $p < 0.01$). The Block Chi-square is 59.60, and the Cox and Snell R² was 0.07.

Table 2.3 Logistic Regression Models for Later-stage Survival

Variable	Model 1b		Model 2b		Model 3b		Model 4b	
	Beta	s.e.	Beta	s.e.	Beta	s.e.	Beta	s.e.
Year 2012	0.02	0.08	-0.26**	0.10	-0.28**	0.09	-0.31**	0.10
Year 2013	0.40***	0.08	0.30**	0.09	0.30**	0.09	0.20*	0.09
Gender	0.74***	0.06	0.23**	0.07	0.27***	0.07	0.30***	0.07
Age Range	0.27***	0.02	0.33***	0.03	0.30***	0.03	0.30***	0.03
Education Level	0.02	0.03	0.07	0.05	0.02	0.04	0.04	0.04
Income Level	0.40***	0.04	0.34***	0.07	0.34***	0.05	0.35***	0.05
SCE			0.14	0.13	0.14*	0.07	-0.16	0.09
Hybrid entrepreneur			1.27***	0.12	1.22***	0.13	1.44***	0.15
Full-time entrepreneur			4.05***	0.12	4.04***	0.12	4.10***	0.14
Country					-0.28**	0.09	-0.38	0.23
Country * SCE	H1b						0.88***	0.15
Country * Hybrid	H2c						-1.55***	0.35
Country * Full-time	H2d						-0.13	0.24
Block chi-square	560.18		2722.24		11.05		75.41	
Model chi-square	560.18		3282.42		3293.47		3368.88	
Cox and Snell R-	0.027		0.150		0.151		0.154	
<u>squared</u>								

*: p<0.05; **: p<0.01; ***: p<0.001. (N= 23573; 14513- U.S., 9060 India)

Hypothesis 2c that stated that, hybrid entrepreneurs would have a similar chance of survival in later-stage entrepreneurial ventures both in India and the U.S. was not supported. It seemed like that for the later-stage entrepreneurial ventures, there continued to be a significant difference between India and the US. In the U.S., entrepreneurs that had full-time employment elsewhere had a higher probability of their businesses surviving in the later stages too. Hypothesis 2d was supported; while being a full-time entrepreneur, favorably impacted the survival of early-stage entrepreneurship in India, there was no difference in the impact of full-time entrepreneurs on the survival of later-stage entrepreneurial ventures in India and the U.S. The Block Chi-square is 75.41, and the Cox and Snell R² was 0.15.

2.4.5 Robustness Checks

Given the rarity of the event in our dependent variable, we checked the robustness of our model specification with the rare event technique (Firth, 1993, Heinze and Schemper, 2002). We performed firth logistic regression (with firth penalized maximum likelihood method) to increase confidence in our results. The results of firth logistic regression are consistent with our findings from the binary logistic regression.

2.5 Discussion

In this study, we examined the impact of entrepreneurs' full-time versus hybrid employment and social connections on new venture survival. Drawing from social capital theory and hybrid entrepreneurship literature, we hypothesized and found that when new firms depend on the entrepreneurial community, social connections play a more prominent role in providing support, than when they rely on other types of government-subsidized funding (Seghers et al., 2012). Interestingly, we did not find support for Hypothesis 2c, which predicted that there would be no difference in the impact of hybrid entrepreneurs on the survival of later-stage ventures in India and the U.S. Rather, our results suggest that U.S. entrepreneurs take longer to get more fully engaged in their business. On the surface, this finding may be interpreted as full-time employment elsewhere often affords healthcare coverage, which entrepreneurs are loath to give up until their business is on a more established footing. Although this indeed may be the case, our findings indicate that, given the uncertainty associated with new ventures, full-time employment elsewhere has a more profound effect on the success of entrepreneurs in developed economies. Although this contradicted our expectations, one explanation for this finding is that presence of hybrid

entrepreneurs in the U.S. are particularly popular among highly educated professionals (i.e., university professors) in the high-technology and R&D sectors. Given the supportive environment offered by universities (Clarysse et al., 2011), many academic entrepreneurs may choose to not leave their salaried jobs.

Our study extends the entrepreneurship literature in a number of ways. While several studies (e.g., Sullivan and Ford, 2014) have sought to employ social capital theory in entrepreneurship research, we extend the literature by offering empirical evidence that the impact of social capital on new venture survival is different in the early stage versus later stage of venture development. By doing so, we provide evidence to explain why an entrepreneur's social network changes over time (Vissa and Bhagavatula, 2012). Furthermore, our exploration of the effects of the strategic choices of the founder on the new venture survival is one of the first systematic studies to address the differences between the impact of the hybrid and full-time entrepreneurs. Additionally, our exploration not only builds on the insights of prior entrepreneurship literature (Agarwal et al., 2017), but also expands the international business literature (Lampert et al., 2019, Scillitoe and Birasnav, Forthcoming) by shedding new light on the country-level differences that affect the survival of new ventures. Given the heterogeneous nature of entrepreneurial activities across countries, it is of great importance to identify the fundamental differences in entrepreneurial activities across countries and investigate their implications (Terjesen et al., 2016). Our research adds to the body of knowledge on underserved entrepreneurship in emerging economies (Bruton et al., 2008) by revealing that an entrepreneur's social connections have a longer and more far-reaching influence on new venture survival in emerging economies.

The results of this study also have some practical implications. Since entrepreneurship is one of the most vital mechanisms contributing to economic and social development, policymakers need to not only focus on providing support to nascent entrepreneurs but also foster engagement among entrepreneurs in order to promote social learning within the entrepreneurial community. Aside from revising existing policy tools, policymakers in developed economies could devote more efforts in creating entrepreneurial programs that specifically target hybrid entrepreneurs, who are likely to be less flexible due to their paid jobs, with programs such as virtual training that do not require physical attendance.

Despite the contributions, our paper does not come without limitations. Social connection with other entrepreneurs was used as an indicator of an entrepreneur's social network. There are many other dimensions of an entrepreneur's social network, such as social connections with venture capitalists, government agencies and large corporations. Furthermore, we are yet to explore how the interactions between entrepreneurs shape the entrepreneur's activities and impact venture survival. Future research could conduct surveys to expand the dataset currently available to increase the robustness of the findings and also consider those who started as hybrid entrepreneurs and finally moved into full-time entrepreneurship. Besides, our theory is yet to be tested for other prominent emerging economies, such as China, Brazil, and Russia. Nonetheless, our research reveals that academics and policymakers need to be cognizant of the structural factors that affect the survival of entrepreneurial firms in the early and later stages. By providing some evidence that the drivers of survival vary between a developed economy and an emerging one, we

underscore the need to explore the policy choices for the emerging economies that are distinct from those of developed economies.

CHAPTER 3

FROM CATERPILLAR TO BUTTERFLY: THE ROLE OF FIRM RESOURCE HETEROGENEITY IN THE TRANSFORMATION OF A STARTUP TO A UNICORN VENTURE

3.1 Introduction

New venture creation is critical for economic growth, as it generates employment, offers customers with more choices, provides incumbents with an incentive to adjust to the new competition, and inspires other businesses to follow suit, supplying a virtuous cycle (Eckhardt & Shane, 2003). Recently, there has been a sharp rise in the number of unicorn ventures—those that have achieved at least one billion dollars valuation (Griffith & Primack, 2015). Companies such as Uber, Zoom, and Slack have been valued in the tens of billions of dollars before their Initial Public Offering (IPO) or acquisition. Anecdotal evidence (Goetz, 2016; Griffith, 2019) suggests that by leveraging advanced technology and relying on innovative business models, the unicorns create paradigm shifts in their existing industry structures (Agarwal et al., 2017).

Despite the considerable attention devoted to studying the determinants of entrepreneurial firm growth (McKelvie & Wiklund, 2010), researchers are yet to identify the antecedents to the creation of unicorn ventures. To shed light on this issue, we borrow insights from the extant strategy and entrepreneurship literature, and seek to answer the research question, “*how does the firm-level resource heterogeneity of start-ups —the founder's prior entrepreneurial experience, possession of intellectual property, and connection to the CVC— affect their propensity to become a new unicorn venture?*”

Building on prior innovation and entrepreneurship research, we specifically explore the role of three sources of firm-level heterogeneity. Following Alvarez and Barney (2007),

we focus on the founders' prior entrepreneurial experience as one of the antecedents to a new venture creation (Corbett, 2007). Additionally, extant research notes that the development of intellectual property (IP) also plays a critical role in a new entrepreneurial firm's performance (Katila & Ahuja, 2002). More recently, studies have demonstrated that given the severe resource constraints faced by entrepreneurial firms, the presence of CVC partnerships may help the creation and capture of value (Wadhwa & Basu, 2013). The conceptual model of our study is shown in Figure 3.1.

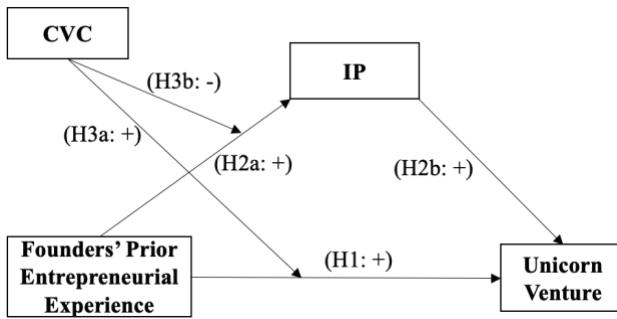


Figure 3.1 Conceptual Model of the Creation of Unicorn Ventures

To seek an answer to our research question, we collected data from a variety of sources, including Crunchbase and Owler as well as publicly available social media websites such as LinkedIn. Our investigation revealed that a startup firm's IP partially mediates the relationship between the founders' prior entrepreneurial experience and the likelihood of becoming a unicorn venture. Further, we found that the presence of CVCs negatively moderates the effect of founders' prior entrepreneurial experience on the venture's IP. Interestingly, we also uncovered that the presence of CVCs did not moderate the relationship between the founders' prior experience and the likelihood of becoming a unicorn venture. Finally, we provide evidence that founders' capabilities may substitute

the capabilities of CVC investors when entrepreneurs appropriate the available IP to create unicorn ventures.

We make several contributions to the entrepreneurship literature. First, while past research has paid attention to the role of resource heterogeneity in organizations' gaining competitive advantages (Barney, 2001), we shed light on the yet underexplored role of firm-level resources as antecedents to a startup venture acquiring the unicorn status. Second, we also contribute to the literature by focusing on the role of CVC in the transition of a startup to a unicorn. Extending prior literature on the role of CVC (Basu et al., 2016), our deep dive brings to light how CVCs moderate the impact of founders' capabilities on the propensity of achieving unicorn status. Third, our research contributes to the ongoing debate on the discovery vs. creation theoretical perspective, which has so far been largely conceptual (Edelman & Yli-Renko, 2010). Our findings show that discovery theory and creation theory do not conflict with each other; rather, they are based on complementary and contextual assumptions about entrepreneurial actions (Alvarez & Barney, 2007). Finally, our study benefits not just academics but also entrepreneurs who aspire to create unicorn startups in the future.

Next, we review the pertinent literature and hypothesize about the relationships connecting founders' entrepreneurial experience, venture's IP, and CVC investment with the likelihood of becoming a unicorn venture.

3.2 Theoretical Background

3.2.1 Unicorn Ventures

In contrast to other startup firms, unicorn ventures receive much higher valuation because their investors believe that they can be disruptors to an existing industry and create blue oceans that may be a source of profit (Kim, 2005). Unicorn ventures normally tend to couple their technology with novel business models to minimize transaction costs and improve efficiency (Zott & Amit, 2007). For instance, founders of unicorn ventures in the sharing economy (exp., Uber, Airbnb, Lending Club, Instacart, and Chegg) used their business model innovations to change the competitive dynamics in existing industries. They created new demand patterns, built new distribution channels, and finally created new institutions that even regulators ended up accommodating (Birkinshaw, 2017). Without fully understanding the potential gains or losses, the founders deliberately pushed boundaries and altered rules to create value out of uncertainty. Nevertheless, even though uncertainty “*rules the day*” (Folta, 2007), it is somewhat unclear how entrepreneurs harvest their innovation during the creation process.

Motivated by the economic and entrepreneurial significance of the unicorn ventures, scholars from a variety of backgrounds, including finance and sociology (Griffith & Primack, 2015), have sought to understand the creation of unicorn ventures. Until recently, few studies paid attention to how unicorn ventures were different from traditional ventures (Bock & Hackober, 2020). Notably, research reports that unicorn startups are substantially backed by investors who focus on the sustainability of the venture’s competitive advantage (Kenney & Zysman, 2019).

3.2.2 Founders' Prior Entrepreneurial Experience and Venture Performance

Researchers generally agree that founders' prior entrepreneurial experience can be critical to the performance of new ventures. Entrepreneurial activity is subject to learning curve advantages where entrepreneurs acquire knowledge and capability by doing the requisite work over time (Zahra & George, 2002). Prior knowledge and experience of the founding team contributes to the ventures' absorptive capacity, which is defined as a firm's ability to recognize the value of new information and knowledge, assimilate, and apply them to create new value (Domurath & Patzelt, 2016). Given that absorptive capacity is cumulative, efforts to develop absorptive capacity by taking advantage of prior experience will make it easier to identify appropriate opportunities in the future and capitalize on them.

The social capital literature also suggests prior experience links the entrepreneur to a network of employees, suppliers, customers, and investors (Aldrich & Zimmer, 1986), which can be crucial to resource acquisition, implementation of techniques to address customer needs, and organizing activities that enhance new venture performance (Shane & Venkataraman, 2013). For example, the start-up experience lends credibility in the eyes of key stakeholders of the new venture, which, in turn, facilitates the process of raising necessary resources to organize the new firm's operations. Taken together, in a discovery setting, the absorptive capacity and the extended social network can assist entrepreneurs to assess, manage, and mitigate the risk of exploiting an opportunity.

Despite this evidence, empirical research examining the relationship between founder experience and venture performance has yielded conflicting results. Taking a more nuanced view of the role of founder experience, Delmar and Shane (2006) suggest the effect of the founding team's start-up experience on new venture survival and new venture

sales are not all the same and are likely to decrease as the venture ages. Besides, founder experience may not always have an unambiguous benefit, and empirical studies linking founder experience to venture success have reported mixed findings (Shepherd et al., 2017), suggesting that the relationship between a founder's experience and venture success is more complex than envisioned.

These findings are not surprising because, according to creation theory, it is not possible, even for experienced entrepreneurs, to effectively calculate the opportunity costs associated with their actions in a new venture (Alvarez & Barney, 2007, p. 8). In other words, entrepreneurs need to make decisions with insufficient information or knowledge and improvise as the uncertainties unfold. Accordingly, to fully investigate the impact of founder experience on new venture success we seek to identify how entrepreneurs utilize their previous experience in the creation of new entrepreneurial opportunities.

3.3.3 Intellectual Property of New Ventures

Intellectual property (IP), a valuable technology resource has often been shown to have a significant effect on new venture performance (Wong et al., 2005). Though it is not immediately clear from the literature how IP may directly lead to a higher valuation of a new venture, entrepreneurial finance studies suggest that investors prefer extremely innovative ventures since the IP provides more innovative routes to grow a new venture (Kortum & Lerner, 2000).

Intellectual property rights, such as patents, may signal the quality of innovative ideas and the venture's commitment to developing those ideas (De Rassenfosse, 2012). Entrepreneurs can use their IP to produce and sell products or services, or they can use the market for knowledge to sell, license, or franchise their IP, thus generating revenue for the

new venture. Furthermore, IP can also be used as a defense mechanism to protect the new ventures' innovative ideas from imitation, which, in turn, may help the new firm to achieve a competitive advantage. Even though the ventures can benefit from the knowledge sharing with their external partners, IP plays a critical role in protecting new ventures' ideas from imitation, even by strategic partners, such as CVC investors.

IP is crucial for the unicorn ventures, since the billion-dollar valuation is based on the premise that the startup firm can possibly benefit from first-mover advantages (Lieberman & Montgomery, 1988) and create imitation barriers to continuously appropriate value from their innovation (Teece, 1986). Again, the research linking founders' prior entrepreneurial experience and IP has yielded mixed findings. On the one hand, experienced entrepreneurs are subject to technological exaptation (Garud et al., 2016), meaning that they are pre-adapted to generating new IP. This can be true because an entrepreneur may find their prior experience beneficial when evaluating the venture's IP, as critical assumptions about the commercialization of a technology can be evaluated and modified by their ex-ante knowledge supporting the discovery role of the founder or entrepreneur. On the other hand, researchers also point out that founders' experience with one domain may make them blind to other opportunities beyond their focused domain (Shepherd et al., 2017). We explore further the extent to which founder experience allows them to discover new ways of using IP versus restricting their creativity.

3.2.4 Corporate Venture Capital and New Venture

The CVC literature suggests that the partnership between large corporations and a new venture creates value for both parties (Rossi et al., 2020). First, CVC which comprises of minority equity investments from incumbent enterprises (Chesbrough, 2002), is considered

helpful in providing both financial capital and complementary resources (i.e., production-related and distribution-related resources) (Katila et al., 2008) to assist new ventures to acquire new customers and provide useful information about customer needs and market trends (Maula et al., 2013). Second, the CVC investors generally encourage ventures' development of IP (Dushnitsky & Lavie, 2010), which, in turn, help the parent corporations to recognize disruptive technologies and technology discontinuities. Third, new ventures can build their credibility based on the relationships with their external partners (Gopalakrishnan et al., 2008). Partnership with a CVC increases the prominence of a new venture within its network, thus enhancing the availability of alternate partners thereby elevating its bargaining power. All of these factors enable the venture to capture more value within, and even outside its eco-system (Ozmel et al., 2017).

However, the long-term success of startup firms may suffer from their alliances with large corporations. Alvarez and Barney (2001) suggest that entrepreneurial firms face a tension between depending on external partners to complement their R&D and having limited resources to manage the collaboration process. Not surprisingly, Huang and Madhavan (2021) find a negative impact of the CVC ties on venture technological performance, suggesting that the value creation through CVC partnership is not equally shared between the startup ventures and their CVC investors. Moreover, Uzuegbunam et al. (2017) find that CVC-supported ventures are likely to focus more on patents than trademarks and the impact of CVC funding on the venture's IP tends to be contingent on entrepreneurs' experience. As a result, researchers suggest new ventures need to consider their defense mechanisms before they approach the CVC investors (Katila et al., 2008). Although prior researchers have paid attention to the value creation for large corporations

through CVC partnerships (Dushnitsky & Lenox, 2006), studies on the impact of CVC from a new venture's perspective remain somewhat scattered. Following insights from prior research, we discuss in greater detail the roles that founders' prior entrepreneurial experience, IP, and CVC involvement play in the creation of unicorn ventures.

3.3 Theory and Hypotheses

3.3.1 Entrepreneurial Experience and Likelihood of Becoming a Unicorn Venture

Literature suggests that the primary task of the founders of startups is to search for profitable solutions to valuable problems (Pryor et al., 2016) and that choosing a problem to solve entails assessing the expected value of potential solutions as well as the new firm's capability to exploit high-value solutions (Fleming & Sorenson, 2004). Accordingly, the problem selection is greatly influenced by the founders' reservoir of knowledge and prior experience (Cassar, 2006). Not surprisingly, Miloud et al. (2012) suggest that the valuation of a startup is typically impacted by the attractiveness of the industry, the quality of the founders, as well as the venture's external ties. Further, once a problem has been identified, the task then becomes acquiring both internal and external related knowledge or capabilities and conducting an efficient solution search (Gavetti & Levinthal, 2000). Given that the startup's valuation can be advanced by the new venture's improved product quality and market growth (Joglekar & LÉvesque, 2009), the impact of entrepreneurial experience on a venture's valuation becomes a function of the founder's ability to obtain resources to develop new products and to properly allocate the resources to market the new products.

Experienced entrepreneurs seem to have an advantage in resource acquisition. Social capital theory (Coleman, 1988) provides evidence that an entrepreneur's prior

experience yields a rolodex of network contacts, that can be leveraged into future ventures. For example, their relationships with Venture Capitalists can be beneficial in obtaining financial capital for the new ventures (Zhang, 2011). Rather than starting from scratch, experienced founders can leverage their social ties with investors, suppliers, and even customers to surmount traditional obstacles facing new ventures. Notably, the social capital of entrepreneurs can be more critical for unicorn ventures as they often rely on timely execution to take advantage of first-mover advantages. Any delay due to insufficient financial or human capital may hurt the ability of the new venture to grow continuously (Davila et al., 2003). Given that unicorn ventures are generally focused on the long term, founders of such ventures typically hold multiple rounds of fund-raising. Without the ability to obtain significant financial capital from investors, the founder would not have the faintest chance of creating a unicorn venture (Davila et al., 2003).

Experienced entrepreneurs also have an advantage in resource allocation (Symeonidou & Nicolaou, 2018). Given that market opportunity can be fundamental for the creation of unicorn ventures, marketing can take a significant percentage of overall expenses. Researchers (Delmar & Shane, 2006) suggest that experienced founders have better skills at structuring a new firm, hiring employees, and, more importantly, establishing contacts with suppliers and consumers. For example, by utilizing the social ties with an Uber board member, Jeff Lawson, a serial entrepreneur and founder of the unicorn venture Twilio expanded its relationship with Uber from powering Uber's SMS to operating texts, alerts and voice calls across all Uber platforms (Helft, 2016).

Founders' prior entrepreneurial experience, defined as the previous creation of startup firms, provides information for opportunity identification and evaluation, resource

acquisition, and firm organizing, which helps the new venture create a competitive advantage. Furthermore, the competitive advantage can be sustained and strengthened when founders can manage both upstream and downstream uncertainty within the value chain (Porter, 1997). Schoemaker et al. (2018) observe that today's business environment has become volatile, uncertain, complex, and ambiguous (VUCA), and in such instances, founders who can sense change, interpret complex signals, and take actions can be crucial for unicorn venture's value appropriation. When compared to first-time entrepreneurs, experienced entrepreneurs are more likely to spot the threat of substitution quickly, since their prior related knowledge and experience can be useful in recognizing and assessing a potential competitor, as well as creating imitation barriers against competitors, which is critical for new ventures to grow continuously and become unicorn ventures. Similarly, entrepreneurs with experience will be able to neutralize the upstream hold-up threats through more effective contracts with suppliers, as they are more likely to have closer relationships with potential suppliers (Bogetoft, 2021) and therefore be able to minimize the transaction costs. Thus, experienced founders are more likely to be efficient in value appropriation by neutralizing the threats of substitution and hold-up. Startup firms founded by entrepreneurs with prior experience can attract more investments to support the long-term growth of their new ventures, thereby leading the path to the unicorn status. Therefore, we hypothesize the following:

H1: Founders' prior entrepreneurial experience has a positive impact on the likelihood of becoming a unicorn venture.

3.3.2 The Mediating Role of IP

Literature suggests that founders often assemble and combine resources to create and capture value from their innovation, so that they can achieve superior performance(Baker

& Nelson, 2005). Research also notes that founders must understand how technology would evolve over time (Deligianni et al., 2022). Notably, founder's resource acquisition abilities help secure the capital to develop and test innovative ideas. Sirmon et al. (2009) further suggest that founders also play a critical role in converting venture's resources into capabilities and leveraging those capabilities to exploit market opportunities. If so, experienced founders have the advantage in leveraging the firm's R&D capability to create new IP and new products.

Simultaneously, previous research notes that new ventures' IP plays a critical role in value appropriation (Teece, 1986) for at least two reasons. First, a unicorn's valuation is based on the hope that the firm can create imitation barriers to protect their innovations, and therefore, appropriate value through the IP regime. Thus, the IP of a startup would allow a new firm to gain the benefits from first mover advantages and prevent the threat of imitation (Michael, 2003). Unicorn ventures, which are more long-term oriented, require an IP regime that protects their innovation not only from current competitors but also creates an imitation barrier from future competitors. Consistently, IP allows new ventures to safeguard their R&D investments while avoiding some of the costs and potential delays involved in bargaining with fragmented rights holders (Ziedonis, 2004), thus ensuring the venture can continuously appropriate their innovation. Besides, exclusive access to technology and customers can create a unique ability to develop needed complementary assets (Schilling, 2010), which then allows s new ventures build a positive self-reinforcement cycle through increased customer base and availability of complementary assets, paving the way to becoming a unicorn venture.

Drawing from the literature that suggests IP can be used as a search mechanism in opportunity discovery (Katila & Ahuja, 2002), we argue that experienced founders are more likely to understand when and how to assemble their IP portfolio, and what patents or trademarks to file. As new ventures rely on IP to create imitation barriers and sustain the first mover advantage, IP can be crucial if founders intend to push the valuation of their venture to an extraordinary level. Thus, we predict the following:

H2: The impact of founders' prior entrepreneurial experience on the likelihood of becoming a unicorn venture is mediated by the venture's IP, such that

H2a: The founders' prior entrepreneurial experience has a positive impact on the venture's IP.

H2b: The venture's IP has a positive impact on the likelihood of becoming a unicorn venture.

3.3.3 The Moderating Role of CVC

In ventures' searching for resources, CVC investors who provide financial capital over multiple funding rounds tend to be relatively patient partners (Basu et al., 2011; Chesbrough, 2002). Their deep pockets allow the new ventures to cross the chasm between early adopters and early majority (Zhang et al., 2021). Specifically, literature suggests that CVCs helps new firms develop sustainable business models (Katila et al., 2008). Accordingly, CVCs are considered helpful in providing complementary resources, assisting ventures to obtain new customers, and providing useful information about market trends (Maula et al., 2013).

Further, to accelerate a new venture's innovation, corporate investors collaborate with them, closely aligning the corporate parent's resources to the needs of the new venture (Keil et al., 2008). In the meantime, the new ventures are not only interested in acquiring financial capital and complementary resources from their CVC partners; they also benefit

from utilizing the embedded social network that the CVC investors possess. Inter-organizational networks offer endorsements regarding the reliability, quality, and reputation of new ventures (Park & Steensma, 2012), which enhance the investors' confidence in the value creation and value appropriation capabilities of new ventures. These capabilities of CVC can create positive network externalities (Schilling, 2002) and positively affect the startups transformation to a unicorn venture. Therefore, we predict:

H3a: CVCs positively moderate the effect of founders' prior entrepreneurial experience on the likelihood of becoming a unicorn venture.

Nonetheless, the resources offered by the CVC investors do not come without a price tag. Although CVCs differ in their motivation regarding the strategic goals, such as gaining a window onto a new technology, entering new markets and financial returns, CVCs typically invest in new ventures that participate in industries with weak intellectual property protection (Dushnitsky & Lenox, 2005). In this setting, new ventures backed by CVCs tend to use limited patenting and generally rely on their market power that is enabled by their investment to capture value from R&D investments (Basu et al., 2011). However, to tap into the CVC investors' resources, the startup firms often facilitate their investors' learning by sharing in detail what their new products or business models are, and how their innovations or IP may be commercialized to make profit, making themselves more vulnerable to value misappropriation by their CVC investor (Alvarez & Barney, 2001). And this vulnerability is likely to increase when the parent corporation operates in related industries (Dushnitsky & Shaver, 2009).

Similarly, the real-option theory (Ceccagnoli et al., 2018; Folta & Miller, 2002) also suggests that CVC investments are steppingstones to evaluate a new venture before an outright acquisition. Given that the IP will add more bargaining power to an acquisition

target, the CVC investors will have less incentive to facilitate the development of ventures' IP. Besides, empirical studies also find that receiving CVC funding early in a new venture's life diminishes the venture's chance of an initial public offering (IPO). (Kim & Park, 2016). The venture's development, in particular, the innovation process becomes a matter of control. Even though, an experienced entrepreneur may be better at managing relationships with external partners, the conflict of interest between the founders and the CVC investors can create tensions in managing innovations within the new venture. And the tension can increase when the founders also have their own resources and capabilities to leverage, which makes both sides equally powerful. Considering the tradeoff associated with external resources (Porter, 1996), the CVC investors may diminish the impact of founders' prior entrepreneurial experience on venture's development of IP. So, we hypothesize the following:

H3b: CVCs negatively moderate the effect of founders' prior entrepreneurial experience on the venture's IP.

3.4 Methods

3.4.1 Data

We test our hypotheses with startup firms in three industries – E-Commerce, Financial services, and Apps. Literature documents that these industries have been fertile grounds for the creation of new entrepreneurial ventures; and disruptive innovators from new ventures in these industries have challenged the dominant firms causing severe systemic effects on the market structure (Rossi et al., 2020). We collected data on 5689 new ventures founded in the United States between 2001 and 2015, since the US has the largest number of unicorn ventures in the world, followed by China (CBInsights, 2021). Besides, U.S.

corporations have started establishing CVCs since the 1960s and they have become increasingly important investors for new ventures (Chemmanur et al., 2014).

A small portion (about 2%) of all new ventures received unicorn-valuation. We adopt post-money valuation to assess whether a new venture is a unicorn venture. Post-money valuation is equal to the pre-money valuation plus new investment and is typically measured after a round of financing from investors. Credit Karma, for example, achieved unicorn-valuation after raising \$175 million in Series D. In other words, the post-money valuation represents the approximate market value of a new venture.

The Crunchbase database was our primary data source on new ventures, their founders and CVC investors. We also supplemented the Crunchbase database with several other startup databases, such as Owle (www.owler.com) and Privco (www.privco.com). In addition, we used social media websites, such as LinkedIn, and manually collected data on the founders' experience to ensure data accuracy and quality. Additionally, we excluded ventures that received less than thirty-million-dollar investments from our analysis. The exclusion of this group is ideal as the minimum funding received by a unicorn venture is approximately thirty million (Chernenko et al., 2020). In addition, we removed non-profit startups from our sample, as the underlying mechanism of growth and valuation can be different from the for-profit ventures. Our sample for analysis includes 1295 new ventures, of which 117 new ventures achieved at least one-billion-dollar valuation.

3.4.2 Variable definitions

Dependent variable. Our hypotheses predict the likelihood of becoming a unicorn venture. *Unicorn* is a dummy variable that takes a value of 1 when the startup firm received at least

one-billion-dollar valuation. The unicorn status of new ventures was as reported in July 2020.

Independent variables.

Founders' prior entrepreneurial experience. We measured founders' prior entrepreneurial experience as the number of startup firms founded by all founders of a new venture (Delmar & Shane, 2006). On average, the founding teams had founded 1.4 startup firms, however, 48 percent of the founding teams had no prior entrepreneurial experience.

IP. To capture the overall innovation activities of new ventures, we take a broader definition of IP, which includes not only patents that assist new ventures in building category-leading products, but also trademarks that enhance the branding efforts of new ventures (Kg & Kline, 2000). We calculated the number of IP filings and registrations during the years 2015-2019, which is five years before the unicorn valuation was reported. To flatten the distribution of the values for all new ventures across the range, we standardized the number of IP to a score from 0.0 to 1.0. The new venture(s) with the highest value is assigned 1.0 and venture(s) with the lowest value is 0.0. Although our measure does not reflect actual number of IP filings, our measure provides a good reflection of factors driving the valuation of new ventures.

CVC. We measured CVC as the number of CVC investors of a new venture. We followed the Crunchbase classification system to determine whether an investor was a corporate venture capital – an investing arm of a corporation, where the investment funds come from the corporation, providing capital to invest in innovative start-up companies. Given most CVCs often invest with other venture capitalists, startup companies funded by

venture capital only constitute the control group to assess the value of CVC for startup firms.

Table 3.1 Descriptive Statistics

Variable	Definition	Mean	SD
Dependent Variable			
<i>Unicorn Venture</i>	1 if a new venture receive at least one-billion-dollar valuation	0.090	0.287
Independent Variables			
<i>Founders' prior entrepreneurial experience</i>	Total number of startup firms previously founded by all founders of a new venture	1.360	2.243
<i>IP</i>	Measurement of innovation output	0.749	0.784
<i>CVC</i>	The number of CVC investors of a new venture	0.440	0.843
Control Variables			
<i>Age</i>	Number of years since a new venture was founded	10.870	3.856
<i>Total Funding Amount (Log)</i>	Amount of total investments that a new venture received	18.324	0.970
<i>Commerce and Shopping</i>	1 is a new venture is operating in "Commerce and Shopping" industry	0.400	0.491
<i>Financial Services</i>	1 is a new venture is operating in "Financial Services" industry	0.500	0.500
<i>Apps</i>	1 is a new venture is operating in "App" industry	0.220	0.412
<i>Startup Cluster</i>	Frequency	Percent (%)	
Atlanta	23	1.80	
Boston	72	5.60	
Chicago	48	3.70	
Denver	21	1.60	
Southern California	112	8.60	
New York	268	20.70	
Silicon Valley	439	33.90	
Washington DC	24	1.90	
Seattle	26	2.00	
Texas	27	2.10	
Other location	235	18.10	

Control variables. We apply several variables that have an impact on the valuation of new ventures. First, even though the deep pockets of investors enable new ventures to grow as quickly as possible, it may still take years to become a unicorn venture. Thus, we controlled the age of new ventures. Second, given the post-money valuation depends on the funding received by the new venture, we controlled for the total funding amount received by the new ventures. In addition, we controlled for new ventures' industries and

locations. Three dummy variables were created for three industry categories: Commerce and Shopping, Finance, and Apps, as a new venture can operate in multiple industries. We also control for the location of the startup clusters, and they include Atlanta, Boston, Chicago, Denver, Southern California, New York, Silicon Valley, Washington DC, Seattle, and Texas. Table 3.1 displays variable definitions and descriptive statistics. The correlation matrix is shown in Table 3.2.

Table 3.2 Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) <i>Unicorn venture</i>	1								
(2) <i>Founders' prior entrepreneurial experience</i>	.102**	1							
(3) <i>IP</i>		.334**	.108**	1					
(4) <i>CVC</i>			.141**	.08**	.167**	1			
(5) <i>Age</i>				-0.031	-.157**	-.086**	-0.095**	1	
(6) <i>Total funding amount (log)</i>					.553**	0.027	.302**	.124**	-0.014
(7) <i>Commerce and Shopping</i>						-0.006	0.031	.062*	-.070*
(8) <i>Financial Services</i>							-.069*	-.109**	-.152**
(9) <i>Apps</i>									.074**
									-0.051
									0.014
									-.287**
									-.401**
									1

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

3.4.3 Analysis and Results

Because our conceptual model incorporates both mediation and moderated mediation, we adopted PROCESS analysis to test our hypotheses (Hayes, 2017). PROCESS modeling is an analytical strategy that integrates mediation and moderation analysis to investigate and test hypotheses about how mechanisms vary depending on context or individual differences (Hayes & Rockwood, 2019), therefore, it has an advantage in the modeling of contingencies of mechanisms. In this study, CVCs positively impact founders' entrepreneurial experience in creating unicorn ventures but negatively impact founders' entrepreneurial experience in generating IP to create unicorn ventures. Thus, PROCESS analysis is an ideal technique to test the two contradictory theoretical routes.

We first tested the direct effect in H1, which states that founders' prior entrepreneurial experience will have a positive impact on the likelihood of becoming a unicorn venture. Table 3.3 shows that founders' prior entrepreneurial experience was positively related to the likelihood of becoming a unicorn venture ($b = 0.128$, $p < 0.01$). The results of Model 2 show that the direct effect of founders' prior experience on the likelihood of becoming a unicorn venture was significant (95% confidence interval [CI] = 0.049, 0.210). Thus, H1 is supported. Moreover, the bootstrapping results show that the indirect effect of founders' prior entrepreneurial experience on the likelihood of becoming a unicorn venture through IP was 0.027 and significant (95% confidence interval [CI] = 0.006, 0.055), indicating the existence of the mediation effect. H2a suggests that founders' prior entrepreneurial experience has a positive impact on new ventures' IP is supported (Model 1, $b = 0.023$, $p < 0.05$). H2b suggests that IP has a positive impact on the likelihood of becoming a unicorn venture is also supported (Model 2, $b = 1.142$, $p < 0.001$). Table 3.3 shows that IP partially mediates the relationship between founders' prior entrepreneurial experience and the likelihood of becoming a unicorn venture. H2 is supported.

Second, we used PROCESS analysis to test the moderated mediation. We set the mean-center function in PROCESS to produce interaction terms. H3b states that CVC negatively moderates the effects of founders' prior entrepreneurial experience on a new venture' IP. Model 3 shows that the interaction term of founders' prior entrepreneurial experience and CVC was negative and significant ($b = -0.021$, $p < 0.05$). Thus, H3b is supported. However, Model 3.4 shows that the interaction term of founders' prior

entrepreneurial experience and CVC was not significant ($b = 0.031$, $p = 0.550$). H3a is not supported.

Table 3.3 Results of Mediation

	Model 1		Model 2	
	IP		Unicorn venture	
Regression results				
IP			H2b	1.142 ***
Founders' prior entrepreneurial experience	H2a	0.023 *	H1	0.128 **
Age		-0.013 *		-0.029
Total Funding Amount (Log)		0.248 ***		2.116 ***
Commerce and Shopping		0.069		0.070
Financial Services		-0.173 **		-0.530
Apps		0.134		0.794
Startup Cluster		-0.006		0.057
R square		0.134		0.272
F value		28.539 ***		
Direct effect				
Founders' prior entrepreneurial experience -> unicorn venture		Direct effect	SE	95% CI
		0.128 (P < 0.01)	0.041	[0.049, 0.210]
Bootstrapping results indirect effect				
Founders' prior entrepreneurial experience -> IP -> unicorn venture		Indirect effect	Boot SE	95% CI
		0.027	0.012	[0.006, 0.055]

Note: SE = standard error; CI = confidence interval. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3.4 also presents that conditional direct effect and indirect effect based on PROCESS analysis, where the value of CVC was set 0 and 1. When there is no CVC, founders' prior entrepreneurial experience has a positive impact on a new venture's IP (effect= 0.029, $p < 0.01$, 95% confidence interval [CI] =0.009, 0.049); however, its effect was not significant when there is a CVC (effect= 0.008, $p = 0.497$, 95% confidence interval [CI] =-0.015, 0.031). Moreover, when there is no CVC, founders' prior entrepreneurial experience has a positive impact on the likelihood of becoming a unicorn venture (effect= 0.119, $p < 0.01$, 95% confidence interval [CI] =0.025, 0.212); and its effect remains positive when there is a CVC (effect= 0.150, $p < 0.01$, 95% confidence interval [CI] = 0.045, 0.255). The bootstrapping results show that indirect effect of founders' prior

entrepreneurial experience on the likelihood of becoming a unicorn venture through IP was 0.032 and significant when there is no CVC (95% confidence interval [CI] = 0.009, 0.064), however, the indirect effect was not significant when there is a CVC (95% confidence interval [CI] = -0.019, 0.039). Table 3.4 shows that the moderated mediation effect of CVC is -0.023 and significant (95% confidence interval [CI] = -0.061, -0.003).

Table 3.4 Results of Moderated Mediation

	Model 3 IP	Model 4 Unicorn venture	
Regression results			
IP			1.112 ***
Founders' prior entrepreneurial experience (FE)		0.029 **	0.119 *
CVC		0.140 ***	0.208
FE X CVC	H3b	-0.021 *	H3a 0.031
Age		-0.011 *	-0.025
Total Funding Amount (Log)		0.238 ***	2.131 ***
Commerce and Shopping		0.077	0.101
Financial Services		-0.168 *	-0.547
Apps		0.129	0.762
Startup Cluster		-0.004	0.062
R square		0.149	0.274
F value		24.928 ***	
Conditional effect of FE on IP			
0		Effect 0.029 **	SE 0.010 95% CI [0.009, 0.049]
1		0.008	0.012 [-0.015, 0.031]
Conditional effect of FE on Unicorn venture			
0		Direct effect 0.119 **	SE 0.048 95% CI [0.025, 0.212]
1		0.150 **	0.054 [0.045, 0.255]
Bootstrapping results conditional indirect effect of IP			
0		Indirect effect 0.032	Boot SE 0.014 95% CI [0.009, 0.064]
1		0.009	0.015 [-0.019, 0.039]
moderated mediation effect of CVC			
		Index -0.023	Boot SE 0.015 95% CI [-0.061, -0.003]

Note: SE = standard error; CI = confidence interval. * p < 0.05; ** p < 0.01; *** p < 0.001

3.4.5 Robustness Tests

We subjected our findings to several robustness checks. First, we assessed the robustness of our finding for H1 by estimating our model using the average number of startup firms created by all founders and find our support for H1 persists. Second, we assessed the results for H2a and H2b by re-estimated our model using *the total number of IP (TIP)* and *total*

number of patents (TP). We find a positive effect of *TP* on the likelihood of becoming a unicorn venture but didn't find a significant effect of founders' prior entrepreneurial experience on *TIP* or *TP*. One explanation is that the valuation of a startup venture depends heavily on its growth potential, which was indicated by its most recent innovation performance rather than its overall performance. Third, we further validated our results by estimating our models using alternative thresholds for ventures' *total funding amount*: 1M, 10M, 30M. Our main results remain fully supported in the alternative specifications. Fourth, we excluded new ventures that were founded during irrational exuberance (2007) and irrational exuberance bust (2008-2009) to examine the possibility that new ventures during this period were somehow systematically different, and our results still hold. Our findings are also robust to the following alternative model specifications: Adding *founder sex* as an additional control variable and including a control variable *number of activities* indicating venture's media exposure.

3.5 Discussion

Unicorn startups have recently captured the imagination of both entrepreneurship scholars and practitioners (Urbinati et al., 2019). Surprisingly, extant literature has paid scant attention in understanding the how startup new ventures transform themselves to unicorn ventures, akin to caterpillars transforming themselves to butterflies. Our study attempts to integrate the insights from several streams of prior research including resource-based theory, entrepreneurship literature, and CVC literature, to empirically examine the role of founders' prior entrepreneurial experience, IP and CVC on the likelihood of becoming a unicorn venture. Our findings suggest that experienced entrepreneurs have advantages in

creating unicorn ventures. However, founders' capabilities can possibly be a substitute to the capabilities of CVC investors when entrepreneurs appropriate their IP to create unicorn ventures.

Surprisingly, our H3a is not supported, suggesting that the role of CVC in assisting entrepreneurs to create unicorn ventures is more nuanced than what prior literature suggests. One explanation is that CVC's resources or capabilities can overlap with the knowledge or capabilities of experienced founders. For example, experienced founders may have built strong relationships with VCs or other types of investors through their prior entrepreneurial experience, therefore, they do not have to depend on the CVC's network or their endorsement to raise funding. However, under conditions of uncertainty, entrepreneurs may not be able to anticipate the specific resources or knowledge they may ultimately need to exploit the opportunities that they may have created (Alvarez & Barney, 2007). Thus, as entrepreneurs act and react to create opportunities, the complementary assets provided by their CVC investors may become less valuable. Furthermore, because external investors are more likely to invest in identified opportunities, CVC investment may even damage entrepreneurs' ability to ask the right questions, alter assumptions, and explore new opportunities.

Viewed holistically, our findings offer new ways of integrating the entrepreneurship and strategic management literature. First, we address the concern about the sustainability of competitive advantage by linking founders' resources and capabilities to founders' abilities to neutralize the threats of imitation, substitution, and hold-ups. While the literature on dynamic capabilities (Eisenhardt & Martin, 2000; Teece et al., 1997) has paid attention to how valuable resource positions are created over time, we extend the

literature by explaining the role of founders' prior entrepreneurial experience in transforming a firm's resources and capabilities into sustainable competitive advantages. Also, Amit and Zott (2001) observe that e-business firms are highly dependent on information-based resources and capabilities, which increase their chances of value migration. Given that some unicorn companies are e-businesses, the major challenge founders face is not only creating competitive advantage for their new ventures, but also sustaining the competitive advantage so that they can push the venture's valuation to the unicorn level. As a result, experienced entrepreneurs, who may have established stable relationships with VCs, suppliers, and customers, are fundamentally anchored to distinguishing their new venture from an ordinary startup.

Further, our study extends the two theories in entrepreneurship—the creation theory and discovery theory. On the one hand, the discovery theory suggests that entrepreneurial opportunity is embedded in the objective environment and successful entrepreneurs can identify and exploit new opportunities (Eckhardt & Shane, 2003). On the other hand, the creation perspective argues that opportunities are created by the actions and enactment of entrepreneurs (Baker & Nelson, 2005). We find that these two theories are complementary, and entrepreneurs can both create and discover different mechanisms to become unicorn ventures. We find that, on the one hand, entrepreneurs create their competitive advantage by erecting barriers to entry, and protecting their information about how to exploit market opportunity (Alvarez & Barney, 2007). On the other hand, entrepreneurs use IP as a means to discover opportunities (Katila & Ahuja, 2002) thereby contributing to the discovery theory. Thus, our research indicates that both the creation and

the discovery lenses may be useful in understanding how founders' prior experience and the presence of IP and CVCs impact the creation of unicorn ventures.

Finally, our findings suggest that researchers take a more nuanced view of the effect of CVCs on new venture performance. Unlike some of the prior research, which argues that the CVC ties add value to new ventures, our results show that the impact of CVC partnership on the partnering firm is more complicated. We find that CVCs may hurt founders' ability to develop IP. Specifically, our results suggest that the CVC tie does not create synergy when both the CVC's parent corporation and founders of a new venture have something to contribute. Rather, the conflict of interests can create tension, which may diminish the effect of founders' experience on new ventures' innovation performance. We extend Dushnitsky and Lenox (2005)'s assertion that large corporations use CVCs to source innovative ideas to supplement their innovation efforts.

3.6 Limitation and Future Directions

Despite being one of the first systematic investigations of the antecedents of unicorn ventures, our study has several limitations, which also illuminate avenues for future research. In particular, four limitations seem worthy of consideration. First, our hypotheses assume the high attractiveness of industries for long-term profitability. Not all industries offer equal opportunities for sustained profitability, and the inherent profitability of its industry is one essential ingredient in determining the profitability of a firm (Porter, 1997). Future research can examine if our theory is generalizable to industries other than Commerce, Financial services, and Apps. Second, unicorns' valuations are often noisy and highly dependent on the expectations of their investors, therefore they are subject to

measuring bias (Tidhar & Eisenhardt, 2021). Future studies may use ventures' IPO valuation or control the network effect for the valuation of platform startups to test our theory. Third, prior research notes that the time of CVC investment and venture stage have an impact on ventures' performance. However, data limitations limit our ability to measure the impact of timing. Lastly, our study specially relates to the power balance between founders and their CVC investors. We suggest that secondary data about the actual involvement of CVC investors in different aspects of venture development may provide additional insights.

CHAPTER 4

TIMING THE IPO: HOW UNICORN VENTURES BUILD THEIR NICHE AND MAKE ACQUISITIONS TO GO PUBLIC

4.1 Introduction

Unicorn ventures (i.e., entrepreneurial firms with more than one billion dollar valuation) are highly capital intensive (Griffith & Primack, 2015) and rapid growth through infusion of public capital represents a key milestone for unicorn ventures (DeTienne et al., 2015). Despite recent studies that viewed venture acquisitions as successful outcomes for entrepreneurial firms (Cotei & Farhat, 2018; Fortune & Mitchell, 2012), researchers generally agree that IPOs are the more successful outcomes for entrepreneurial ventures. Prior research has heavily relied on the occurrence of an IPO as a measure of new venture success (Shane & Stuart, 2002). For instance, Poulsen and Stegemoller (2008), report that entrepreneurs perceive an IPO exit as more rewarding when their businesses are highly innovative.

Following prior research by DeTienne & Cardon (2012), Harada (2007), and others, researchers have explored the effects of founder characteristics as well as firm characteristics, such as firm size, age, and venture innovation and strategy on a new firm's performance. Researchers generally note that an exit by an Initial Public Offering (IPO) is more appealing to founders, who are motivated by financial wealth (Fauchart & Gruber, 2011); and that ventures targeting exit through IPO are associated with larger founding teams and greater intellectual property protection. We extend researchers' understanding of the performance of unicorn ventures and further the extant IPO literature by seeking an

answer to the research question, “*what are the antecedents to the IPO exit of a unicorn venture?*”

More specifically, we explore the effect of the age of a unicorn venture on its exit through IPO. There are several reasons to concentrate on age as a firm-level heterogeneity. First, time is a complex and multifaceted factor in strategic entrepreneurship research (Balasubramanian & Lee, 2008; Suarez et al., 2015), and it has played a prominent part in population ecology research (Hannan & Freeman, 1977; Mens et al., 2015). Indeed, an entrepreneurial venture needs time to establish legitimacy and competitive advantage to become a unicorn venture (Fisher et al., 2017; Hitt et al., 2001; Zimmerman & Zeitz, 2002). Accordingly, ventures make choices about which businesses to enter and compete in at various stages of their lives (Kotha et al., 2011). Second, ventures must also determine whether new capabilities need to be acquired through acquisitions to compete in their respective fields (Shrader et al., 2009). Finally, ventures need to consider whether their diversification and acquisition strategy should remain constant over time or be adjusted to accommodate the organizational and environmental changes (Xie & O'Neill, 2014). As a result, we believe that the IPO exit of unicorn ventures may vary with firm age.

Despite the importance of firm age in the pursuit of firm strategy, most studies in the strategic entrepreneurship literature restrict the analysis of firm age to simply understanding its impact on firm survival. They primarily concentrate on the liability of newness, implying that younger entrepreneurial firms lack trust in existing relationships, social capital, and economic capital (Morse et al., 2007). The question of how firm age influences the exit of a unicorn startup remains unanswered. Despite the potential importance of firm age to organizational changes, most population ecology studies look at

the influence of firm age on a variety of performance measures at the industry or population level, particularly in mature industries (Betton & Dess, 1985; Swaminathan, 2001). We begin to close the gap by considering age-related factors that impact how a venture gets to an initial public offering after it has received unicorn status.

To answer our research question, we gathered firm-level data on unicorn ventures founded in the United States between 1983 and 2021. Using the deep pockets of their investors, unicorn ventures were able to consider their diversification and pursue acquisitive growth (Bock & Hackober, 2020). The sample enables us, to the best of our knowledge, to be one of the first studies to investigate how entrepreneurial firms use diversification and acquisition strategy to achieve superior performance (i.e., an IPO). Given the importance of entrepreneurial firms in the current economy, it is imperative to comprehend how firm age and its strategic choices of the extent of diversification and acquisitions influence its likelihood of IPO. The conceptual model of our study is shown in Figure 4.1.

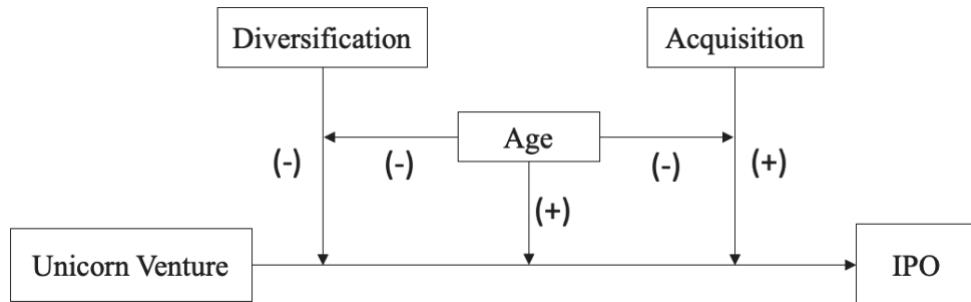


Figure 4.1 Conceptual Model of the IPO of Unicorn Ventures

Our research finds that firm age has an overall positive impact on a unicorn venture's likelihood of exit through IPO; however, the positive impact shifts to negative after a certain age. Specifically, there is an inverted-U relationship between firm age and

the likelihood of an IPO. The transition from a positive to a negative association between firm age and the likelihood of an IPO occurs between 12 and 15 years, implying that a unicorn venture has a limited window for an IPO. Furthermore, we reveal that unicorn ventures with fewer diversifications have an advantage when the IPO is earlier, whereas ventures with more diversifications have an advantage in later IPO. Finally, we provide evidence that acquisitions early in the life of a unicorn have a more significant influence in assisting it to go public.

This study makes three contributions to the literature. First, we bridge the gap between the entrepreneurship literature and the population ecology literature by exploring the role of firm age and entrepreneurs' strategic decisions in shaping the IPO exit of unicorn ventures. Our paper highlights the curvilinear effect of firm age and proposes a time frame for an IPO. Contrary to theory (Barroso & Giarratana, 2013), we find that diversification reduces a unicorn venture's likelihood of an IPO. Nevertheless, the negative impact can be mitigated by firm age. We also demonstrate the positive effect of acquisition on a unicorn ventures' IPO, and this positive effect diminishes with age. By demonstrating the moderating role of age, we emphasize the importance of adjusting firm strategy to accommodate organizational and environmental changes as the venture evolves. Finally, because entrepreneurial firms are typically considered somewhat focused, little research has been conducted to investigate the impact of diversification of entrepreneurial firms. Similarly, entrepreneurial firms are frequently viewed as acquisition targets but rarely as potential acquirers. Our investigation of diversification and acquisitions of entrepreneurial firms is essential as the entrepreneurial ecosystem has seen a significant increase in the

number of acquisitions made by startups, particularly unicorn ventures (Shrader et al., 2009).

In the next section, we first present a literature review on the role of firm age in overcoming liability of newness and building legitimacy, followed by a link between firm age and diversification and acquisition strategy. Next, we present hypotheses about how entrepreneurial ventures expand their focus and make acquisitions to go public as they age. The Methods section then describes our sample, measurements, and analysis procedure. We then present the findings of the study. Finally, the paper concludes with a discussion of the implication of the findings and limitations of the study.

4.2 Theoretical Background

4.2.1 Legitimacy and Entrepreneurial Ventures

Suchman's theory of the legitimacy of a firm provides the overarching theoretical framework for our study. According to Suchman's (1995) theory, one of major challenges for entrepreneurial firms is to build legitimacy and capabilities to overcome the liability of newness. Legitimacy refers to how well the organizational form is accepted by stakeholders as well as whether the firm's product offerings and operating procedures meet the expectations for comparable existing firms (Rindova et al., 2005; Stinchcombe, 2000). According to Fisher et al. (2016), an entrepreneurial venture needs to work toward not only achieving but also managing organizational legitimacy as it evolves and grows. In other words, it needs to attain legitimacy in order to gain access to resources, such as financial capital, employees, suppliers, customers and regulatory support, as well as manage the

uncertainty for stakeholders by demonstrating their ability to assemble these resources to build capability to compete on the market (Zhang & White, 2016).

Researchers have noted that entrepreneurial ventures rely on resources derived from a diverse range of audiences, who, in generally, have varying norms, beliefs, rules, and procedures for assessing a venture (Cumming & Johan, 2017). Since legitimacy assessments are a social judgment that resides in the eye of the beholder (Bitektine, 2011), they are highly dependent on the type of audiences. On the one hand, pre-unicorn ventures are typically evaluated by private resource providers such as investment banks or venture capitals through due diligence analysis of their innovation (De Bettignies & Brander, 2007). Since receiving the unicorn title, they have gained some legitimacy, indicating the quality of their product or service and attesting that the venture is in desirable, proper, or appropriate form (Kerai, 2017). The “legitimacy of a unicorn venture” can increase organizational attractiveness and credibility in the eyes of investors, suppliers, customers, and employees (Moser et al., 2015).

Pre-IPO ventures, on the other hand, are about to be evaluated by public investors. Since the nature of the resource provider assessing the legitimacy of an entrepreneurial venture will change, the norms and beliefs used to evaluate the venture should also change (Garud et al., 2014). Due to their inability to conduct due diligence or industry analyses, public investors typically evaluate firms based on the financial performances, such as revenue, profit and market share (DuCharme et al., 2001). Thus, the “Unicorn to IPO” efforts is directed to manage the firm legitimacy in terms of market access, revenues and numbers of employees (Certo et al., 2009).

Researchers also suggests that pre-IPO phase is a learning period during which a venture refines its idea and strategy, while stakeholders access its potential risk and return (Babich & Sobel, 2004). Even though the pre-IPO learning process reduces the possibility of a costly mistake, it delays the realization of revenues for the firm, creating an opportunity cost that varies depending on the quality of the idea (Jovanovic & Rousseau, 2001). The better an entrepreneurial venture's idea, product, or business model, the higher the opportunity cost of delay, and the sooner the firm should go public. As a result, the waiting period before an IPO is the result of a tradeoff between firm learning and the opportunity cost associated with the delay to market. Taken together, the influence of legitimacy on a new venture's IPO is contingent upon firm age at the time of IPO.

4.2.2 Diversification, Acquisition and Knowledge Learning

Diversification of a firm refers to its variance in resource utilization (Freeman & Hannan, 1983). Early in life, firms may change course frequently as they search for attractive opportunities (Leatherbee & Katila, 2020). Entering new fields increases the stock of opportunities to which the firm has access (Fleming & Sorenson, 2004). The knowledge obtained in the new field can be recombined with the existing expertise of the venture to introduce heterogeneity in knowledge, enhancing the venture's problem-solving capability (Zahra et al., 2000). In a more dynamic view, firms with broad knowledge have greater flexibility and can more easily adapt to environmental changes, such as changes in customer preferences (Ebben & Johnson, 2005). Entrepreneurial firms' scope, though typically considered narrow, are not fixed. The pivot literature (Kirtley & O'Mahony, 2020) suggests that entrepreneurial ventures incrementally modify their focus to achieve success, implying changes in diversification.

However, researchers also suggest that diversification necessitates experimentation to understand the domains and their underlying mechanisms, which can harm output and quality by reducing reliability (Sorenson et al., 2006). To make an impact, firms must develop a deep understanding of the new field that they enter in order to build upon existing knowledge (Kotha et al., 2011). Firms, on the other hand, can find it difficult to absorb knowledge when they operate in multiple domains at the same time, likely reducing novelty and impact because they are not able to invest in maximizing contributions to the various fields that they enter (Nooteboom, 2000). Furthermore, in resource constrained entrepreneurial firms, assimilation, conversion and exploitation of knowledge can be time-consuming and costly due to the increase in coordination costs for processing knowledge from multiple domains (Camisón & Forés, 2010).

Not surprisingly, researchers note that acquiring other entities in the desired domain is considered one of the fastest ways to enter a new market, acquire new technology capability, and grow (Vermeulen & Barkema, 2001). Acquisitions enlarge the acquirer's knowledge base, revitalize the firm, and enhance its ability to respond adequately to the changing environment (Bresman et al., 1999). In addition, acquisitions help acquirers break through rigidity and inertia and infuse the firms with technological renewal (Briscoe & Tsai, 2011).

Nevertheless, acquiring a firm with a valuable knowledge-based resource does not assure that the knowledge will be successfully transferred during integration (Sarala & Vaara, 2010). Researchers have found that acquisitions require integration cost and present the problem of cultural clashes and tensions when they are implemented, which may cause immediate problems and unsatisfactory performance (Teerikangas & Thanos, 2018). The

integration of an acquired firm into a parent firm is complicated by the differences between the two organizations (Cording et al., 2008). Lodorfos and Boateng (2006) suggest that differences in organizational culture and management style can damage the integration process and, consequently, post-acquisition performance. In a related vein, researchers emphasized that firms with greater age-related structural inertial tend to have more trouble with integration (Mens et al., 2015). We sought to provide a better understanding of how acquisitions impact acquirers' performance and what role firm age plays.

4.3 Theory and Hypotheses

4.3.1 The Role of Age in Establishing the Legitimacy of a Firm

As Rome was not built in a day, neither is the legitimacy of a firm (Suddaby et al., 2017). The establishment and maintenance of new venture legitimacy is an complex process that unfolds over time (Fisher, 2020). For a new venture to be perceived as legitimate, it needs to be desirable, proper, or appropriate within an established system of norms, values, beliefs and definitions (Suchman, 1995). In other words, legitimacy implies similarity and a sense of belonging. Nevertheless, distinctiveness and novelty are at the core of unicorn ventures, which typically create paradigm shifts in their existing industry structures (Agarwal et al., 2017). As a result, it appears that unicorn ventures will take longer to be perceived as legitimate. For example, their employees may engage in a variety of time-consuming efforts to learn the new business model and establish new routines (Gong et al., 2005).

Legitimacy itself is also a resource, which is necessary to tap into other resources provided by key stakeholders, such as customers, suppliers, sources of finance, and the

government (Zimmerman & Zeitz, 2002). However, because each type of resource provider applies different values and practices, they judge the legitimacy of a venture differently. Customers, for instance, evaluate a firm based on their satisfaction with its products (George Nagy & Michele Kacmar, 2013), whereas investors are more concerned with the market capabilities of the venture (Homburg et al., 2014). In order to appeal to different resource providers at different development stages, entrepreneurial ventures have to make more efforts to frame their ventures to gain legitimacy from a variety of stakeholders (Fisher et al., 2017).

More importantly, as a unicorn venture progresses to pre-IPO stage, the expectations placed on it become more complex and challenging as it becomes established. It is typical for stakeholders to compare a venture to a cohort of similar ventures in the same stage of development. Therefore, the pre-IPO unicorn venture is likely to be evaluated against more established firms. For external resource-holders such as public investors, uncertainty associated with a firm can arise due to characteristics associated with the venture itself, such as firm age (Sorenson and Audia, 2000). Therefore, we propose:

H1a: The age of a unicorn venture has a positive effect on its likelihood of an IPO.

4.3.2 Balancing Legitimacy and Innovation

Notably, the greater efforts the venture make to establish legitimacy over time, the more likely the venture will be risk-averse and credibility-oriented, focusing on generating stable revenue and profit (Zimmerman & Zeitz, 2002). In other words, the form of learning will shift from exploration to exploitation as they age, slowing down their innovation engine (Xie & O'Neill, 2014). Not surprisingly, Balasubramanian (2007) found that technical

quality of innovation falls with firm age. As businesses grow older, the cost-cutting benefit from learning is more than offset by the burden of knowledge depreciation and the crushing defeat of technical quality due to industrial technological advancement (Boone et al., 2008).

Literature suggests that the wave of technological innovation has accelerated industrial technological changes (Park & Bae, 2004). Unicorn ventures are typically found in such technology-intensive industries, where successive technological changes have shortened product life cycles, resulting in rapid obsolescence of existing products (Sørensen & Stuart, 2000). Under such circumstances, unicorn ventures can easily lose their competitive advantages if they cannot keep up with the rapid technological changes.

As a unicorn venture grows older and more established, it will have more trouble to follow up the industrial technological advancement due to structural inertia (Mens et al., 2015). Moreover, the longer a venture waits before IPO, the more likely it will allow organizational inertia to develop. Prior studies have highlighted some drawbacks of a late IPO, such as losing its momentum (Shepherd & Zacharakis, 2001). Taken together, unicorn ventures that wait too long to IPO fail to realize the benefits of legitimacy they have built while also running the risk of falling behind the industry life cycle. Thus, we predict the following:

H1b: The age of a unicorn venture has an inverted-U relationship with its likelihood of an IPO.

4.3.3 Focus or Spread?

Unlike established firms, which move into a new field to take advantage of abundant resources, unicorn ventures move in to a field quickly in order to capitalize on being first

to market (Yang et al., 2011). Although firms with broad scope benefit from risk spreading and economies of scale, they are also subject to intense competition, increasing the risk of disbandment as well as encouraging organizational transformations that manipulate resource allocation (Stanislav D. Dobrev et al., 2001). In this sense, entrepreneurial firms with less diversification seem to have an advantage when infrastructure is scarce, and resources are limited.

The advantage accrue to a firm when it can obtain the first mover advantages through technological leadership, acquisition of scarce resources, and innovative business models that help firms capture market share and achieve brand recognition (Markides & Sosa, 2013). Knowledge depth is critical to realizing the advantage, because unicorn ventures must be knowledgeable about a specific domain and increase the complexity of knowledge structure in order to lead cutting-edge innovation. Knowledge breadth, on the other hand, can make the acquisition of resources even more different and time-consuming (Mannucci & Yong, 2018).

Diversification, defined as the range of resource availability and the breadth of markets in which the firm operates, can have a different impact on firm performance, depending on the type of firm and the evolution of their industries (Sorenson et al., 2006). Given that the product life cycles in technology-intensive industries are relatively short, being focus allows firms to be more efficient with managerial attention and resources allocation. A unicorn venture can benefit from focusing on their specific domains and capitalizing on the first mover advantage. In other words, it appears that building legitimacy in one field is easier for unicorn ventures than in multiple fields. Therefore, we suggest:

H2: The diversification of a unicorn venture has a negative effect on its likelihood of an IPO.

4.3.4 Make or Buy?

Speed to market or early mover strategy has become important for achieving competitive advantage in an environment of fast-changing technology and customer demands (Jiyao et al., 2005). Under such circumstances, acquisitions would be a useful tool to quickly lower both technology and market uncertainty (Capron & Shen, 2007). Technology uncertainty refers to the degree of familiarity with a given technology or degree of change in the technologies relative to products developed by the company (Tatikonda & Montoya-Weiss, 2001). Innovation with higher technological uncertainty requires greater information processing during the execution of the project. When innovation occurs through internal development, it often takes a decade or more to fine-tune the business to achieve a competitive advantage. Acquisitions, on the other hand, can provide acquirers with immediate access to the technological capability of the acquired firm and are thus considered to be beneficial in mitigating technological uncertainty and shortening time to market (Lee & Lieberman, 2010).

From the market perspective, uncertainty stems from not knowing what the customers desire from the new technology (Fang, 2008). In other words, businesses have little understanding of who the customers are, what they want, and how to reach them. Researchers have noted that firms use acquisitions to overcome entry barriers, fill persistent gaps in their existing products and expand their business in new directions (Lee & Lieberman, 2010). The acquiring firm can gain a new source of revenue and profit by tapping into the acquired firm's market and customer base.

More importantly, unicorn ventures tend to be growth-oriented, and acquisitions can open up new avenues for rapid expansion (Kim et al., 2011). In other words, the acquisition of other businesses can stimulate the growth of the entrepreneurial ventures. For example, previous unicorn ventures, such as Facebook and Twitter aggressively acquired other businesses to grow bigger before their IPOs (Rowley, 2017). Taken together, acquisitions allow a unicorn venture to grow with proven technology and a well-established customer base, making them more legitimate in the eyes of public investors. So, we predict:

H3: The acquisitions made by a unicorn venture has a positive effect on its likelihood of an IPO.

4.3.5 The Moderating Effect of Age

The literature at the heart of our theoretical model - Suchman's theory of firm legitimacy, its more recent developments (Fisher, 2020; Fisher et al., 2017; Wiklund et al., 2010), as well as the knowledge learning literature (Mannucci & Yong, 2018; Nickerson & Zenger, 2004) – suggests that young firms systematically differ from older firms in their innovation performance when they enter new technological fields. Kotha et al. (2011) suggest that older firms tend to have accumulated experience and slack resources, such as research laboratories and scientific human capital, which encourage exploration for growth. When operating in multiple fields, older firms with better absorptive capacity and sufficient resources are expected to outperform younger firms with severe resource constraints and a lack of the efficiency-enhancing experience (Kotha et al., 2011). In other words, ventures will grow out of the burden of limited resources and lack of experience to benefit from diversification.

Researchers also note that diversification provides a long-term positional advantage (Sorenson et al., 2006). Entering new markets allows the company to tap potentially unexplored resources, reduce risk by spreading it across multiple operational domains, and generate economies of scale and scope across similar functions in different lines of business (Wan et al., 2011). In addition, environmental selection has been emphasized in the work on organizational ecology theory (Hannan & Freeman, 1977), implying that broader scope is favored in the long run due to technological and market changes over time. Firms with more diversification tend to have greater resource mobility and are more adaptable to changing market conditions. Thus, diversification is desirable in the long run. Therefore, we hypothesize the following:

H4a: The age of a unicorn venture weakens the negative effect of diversification on its likelihood of IPO.

Besides accumulated experience and resources, older firms also appear to have high stability, meaning that their organizational structures are highly reproducible (Mens et al., 2015). Organizations are growing into higher structural inertia as members take time to learn to trust and cooperate with one another and to learn organization-specific skills and routines (Pentland et al., 2012). As the venture's routines become more stable, resource reconfiguration will become more difficult, reducing the impact of learning from acquisition on perceptual performance (Liu et al., 2013).

Furthermore, managing culture in acquisition are a key element influencing the effectiveness of the integration process and consequently the acquisition performance (Teerikangas & Thanos, 2018). The culture of older firms tends to be more settled and the integration process will face greater organizational challenges due to cultural differences. Using a panel dataset covering Sweden's population of startups from 1997 to 2021,

Grillitsch and Schubert (2021) found that the growth of entrepreneurial firms is positively correlated with integrating new capability early in their life, while a later integration is associated with lower growth. As a unicorn venture matures, the costs of integrating new capability increase and may eventually outweigh the benefits. So, we predict the following:

H4b: The age of a unicorn venture weakens the positive effect of acquisitions on its likelihood of IPO.

4.4 Methods

4.4.1 Data

Our empirical analysis is based on a dataset of unicorn ventures in the United States. We chose unicorn ventures in United States as our research context for several reasons. First, the United States has the largest number of unicorn ventures in the world, followed by China (CBInsights, 2021). The rise of unicorn ventures in United States is supported by institutions, such as incubators, accelerators, angel investing and, more importantly, venture capitals (Gornall & Strebulaev, 2020). Second, the U.S. entrepreneurial ecosystem has mature infrastructures for entrepreneurial firms to capitalize opportunities. Many types of infrastructures, such as core technology infrastructures, market infrastructures, and financial infrastructure, can provide new ventures with substantial and sophisticated resources, assisting a private startup to go public (Audretsch et al., 2015). Third, the U.S. entrepreneurial ecosystem has witnessed a high rate of acquisition made by unicorn ventures due to deep pockets of their investors (Shrader et al., 2009).

We used the Crunchbase database as our primary source of data on firm age, industry groups, and acquisition activities. We also supplemented the Crunchbase database with several other startup databases, such as Owler (www.owler.com), Privco

(www.privco.com) and Factiva. In addition, we manually collected data from Internet searches to improve data accuracy and reduce missing data.

The data contain the population of unicorn ventures founded in United States between 1983 and 2021. The firm's age ranges from 1 to 39 years, with an average age of 10. Our sample included 808 unicorn ventures, 171 of which went public as of January 1, 2022. More than one-fifth of unicorn ventures have gone public, implying that IPOs are a common phenomenon in this population.

4.4.2 Variable Definitions

Dependent variable.

IPO. Our hypotheses concern the likelihood of unicorn ventures going public. Our metric was a binary variable that took a value of 1 if unicorn ventures went public by January 1, 2022, and 0 if they did not. Prior research has heavily relied on the occurrence of an IPO as a measure of new venture success (Shane & Stuart, 2002). The importance of this measure in this study is underscored by the fact that our sample ventures are highly capital intensive and rapid growth through infusion of public capital represents a key milestone for unicorn ventures. Despite some recent studies that viewed venture acquisitions as successful outcomes for entrepreneurial firms (e.g., Waguespack and Fleming, 2009), few would disagree that IPOs are the most successful outcomes for entrepreneurial ventures. DeTienne et al. (2015), for instance, reported that entrepreneurs perceive an IPO exit more rewarding when their initial opportunity is highly innovative.

Independent variables.

Age. Firm Age was computed as the current year minus the year in which the firm was founded. Age in this study is also the main moderating variable. In a few cases where founding information was missing in Crunchbase, we manually searched on company websites for the founding year. The average firm age in the sample is 10, and the average firm age at IPO in the sample is 12.

Diversification. We follow Sorenson et al. (2006), which states that an organization's diversification reflects the process of expanding the scope of its technological expertise and market knowledge. Specifically, we measure diversification of an entrepreneurial firm in terms of spread of industry groups in which a firm operates. A Firm operating in a single industry group have a minimum diversification of 1; and a firm operating in three industry groups, such as Fair, a car leasing company operating in Financial Service, Internet service, and Transportation, has diversification of 3.

Number of Acquisitions. To test for the impact of acquisition on an entrepreneurial firm's likelihood of an IPO, we look at the number of acquisitions made by a firm (Wan & Yiu, 2009). It is measured as a count of the number of firms acquired by a unicorn venture before their IPO. If the unicorn venture has not had an IPO, then it is the number of firms acquired by January 1st, 2022.

Control variables. We control a number of potentially confounding factors. A key control variable is the total funding amount, which is calculated as log transfer of total financial capital received by a unicorn venture in dollars. Both entrepreneurship and financial literature have emphasized that the importance of financial capital in determining venture growth. Furthermore, Prior studies indicates that entrepreneurial ventures achieve

superior performance by appropriating value from their innovation (Teece, 1986). We control for a venture' innovation activity, specifically its number of intellectual properties, which includes both patents and trademarks. Moreover, we control the effect of social capital of entrepreneurial ventures through the number of founders and investors. We also control for the number of investments made by a unicorn venture, which are typically expected to have a positive impact on venture growth (Aivazian et al., 2005).

4.4.3 Analytical Approach and Results

We estimate unicorn ventures' probability of having an IPO with binary logistic regression, which is appropriate for obtaining causal inference when the dependent variable is dichotomous (Hosmer Jr et al., 2013). Three different models were used. Our baseline model included all the control variables – Total Funding Amount, Number of Patents, Number of Trademarks, Number of Founders, Number of Investors, and Number of Investments. In Model 2, we added the three independent variables – Age, Diversification, and Acquisitions. We also included Age Square to test the curvilinear effect of firm age. In Model 3, we included the two interaction terms – Age * Diversification, and Age * Acquisitions.

Table 4.1 provides the descriptive statistics of the key context variables. Unicorn ventures have more than two founders and more than 18 investors on average. The average amount of investments of unicorn ventures is less than 1. However, on average, unicorn ventures have more than 69 patents and 22 trademarks, operate in nearly 4 industry groups, and have made more than 2 acquisitions. Table 4.2 reports bivariate correlations among the study variables. Correlation coefficients were in general significant and consistent with our

expectations. Their magnitudes were modest, with the highest being 0.45. Hence, multicollinearity should not be a concern.

Table 4.1 Descriptive Statistics

Variable	Measurement	Mean	SD
Dependent Variable			
<i>IPO Status</i>	If a unicorn venture went public, the value is 1, otherwise it is 0.	0.21	0.41
Independent Variables			
<i>Age</i>	The number of years since a venture was founded	10.06	5.26
<i>Diversification</i>	The number of industry groups in which a venture operates.	3.88	1.52
<i>Acquisition</i>	The number of acquisitions made by a venture	2.65	6.13
Control Variables			
<i>Total Funding Amount</i>	Total funding amount (Log)	19.88	0.96
<i>Number of Patents</i>	The total number of granted and pending patents	69.06	447.19
<i>Number of Trademarks</i>	The total number of granted and pending trademarks	22.24	42.06
<i>Number of Founders</i>	The total number of founders	2.61	1.33
<i>Number of Investors</i>	The total number of investors	18.44	13.76
<i>Number of Investments</i>	The total number of portfolio companies	0.99	7.39

Valid N=808

Table 4.2 Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10
1 IPO	1									
2 Number of Founders	.036	1								
3 Number of Investors	.092**	.149**	1							
4 Number of Investments	.061	-.019	.123**	1						
5 Total Funding Amount	.267**	.059	.332**	.139**	1					
6 Number of Patents	.161**	.087*	.072	.180**	.240**	1				
7 Number of Trademarks	.265**	.039	.104**	.132**	.274**	.445**	1			
8 Age	.311**	-.082*	-.078*	.039	.131**	.114**	.300**	1		
9 Age Square	.250**	-.099**	-.118**	.030	.093**	.086*	.291**	.943**	1	
10 Diversification	-.052	.057	.007	.014	-.087*	.014	-.065	.097**	.072*	1
11 Acquisition	.347**	.113**	.143**	.196**	.305**	.619**	.523**	.276**	.231**	.027

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Tables 4.3 presents the results of the logistic regression analyses. Starting with model 1, we note that the likelihood of Chi square suggest that the overall model is

statistically significant. This result is not surprising given the large number of observations. An analysis of Table 4.3 shows Total Funding Amount, Number of Patents and Number of Trademarks are significant in Model 1. It appears that, in our sample, unicorn ventures with more funding, patents and trademarks are more likely to go public. This is consistent with findings in venture capital and IP research (Davila et al., 2003).

Table 4.3 Results of Logistic Regression Analyses

DV: IPO		Model 1	Model 2	Model 3
Variables				
Controls				
Total Funding Amount		0.59 ***	0.53 ***	0.54 ***
Number of Patents		0.00 *	0.00	0.00
Number of Trademarks		0.01 ***	0.00	0.01 +
Number of Founders		0.03	0.07	0.08
Number of Investors		-0.01	-0.01	-0.01
Number of Investments		0.00	-0.01	-0.01
Ivs				
Age	H1a		0.34 ***	0.27 **
Age Square	H1b		-0.01 **	-0.01 **
Diversification	H2		-0.18 *	-0.54 **
Acquisition	H3		0.13 ***	0.24 **
Interaction Effects				
Age * Diversification	H4a			0.03 *
Age * Acquisitions	H4b			-0.01 +
Block chi-square		85.75	80.41	7.146
Model chi-square		85.75	166.17	173.31
Nagelkerke R Square		0.176	0.323	0.335
Cox&Snell R Square		0.117	0.214	0.222

Note: N=808. + p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

When the independent variables are introduced in Model 2, the Model Chi-square increased from 85.75 to 166.17; and the Cox and Snell R2 increased from 0.117 to 0.214. We note strong support for H1a (Table 3, Model 2, $\beta = 0.34$, $p < 0.001$), which stated that firm age has a positive effect on a unicorn venture's likelihood of an IPO. In support of H1b, which stated that firm age has an inverted-U relationship with a unicorn venture's likelihood of an IPO, we find that a negative and significant coefficient of Age Square

(Table 3, Model 2, $\beta = -0.01$, $p < 0.01$), therefore H1b is also supported. Furthermore, Model 3 shows that the impact of Diversification on the likelihood of an IPO was negative and significant (Table 3, Model 2, $\beta = -0.18$, $p < 0.05$) and that the impact of Acquisition on the likelihood of an IPO was positive and significant (Table 3, Model 2, $\beta = 0.13$, $p < 0.001$). Thus, both H2 and H3 are supported. To interpret our results, we plotted the effect of age on the likelihood of an IPO to determine the nature of the contingent relationship. Figure 4.2 suggests that the likelihood of IPO has an inverted-U relationship with firm age.

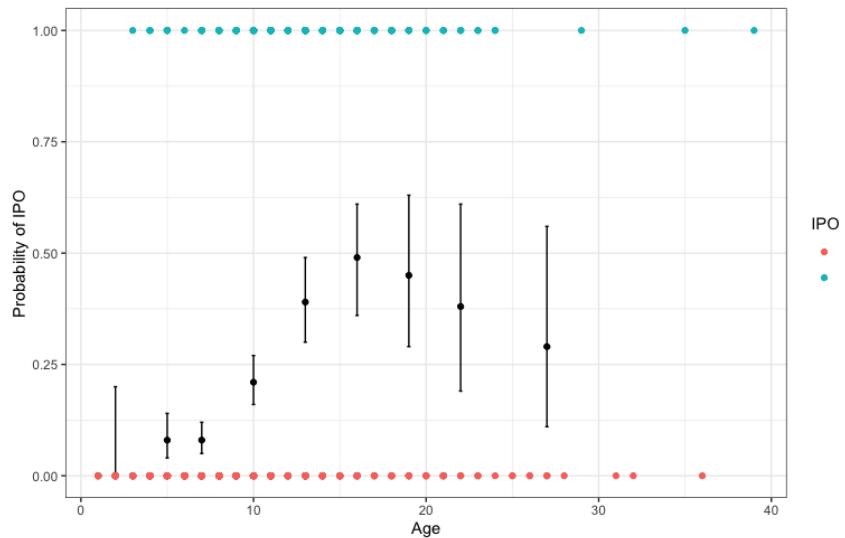


Figure 4.2 A Curvilinear Relationship Between Age and Likelihood of an IPO

In the final model (Model 3), we ran the interaction terms. The Model Chi-square increased to 173.31; and the Cox and Snell R2 increased to 0.222. Hypothesis 4a, which stated that firm age weakens the negative effect of Diversification on the likelihood of an IPO, was fully supported (Table 4.3, Model 3, $\beta = 0.03$, $p < 0.05$). Hypothesis 4b, which stated that firm age weakens the positive effect of acquisition on the likelihood of an IPO, was marginally supported (Table 4.3, Model 3, $\beta = -0.01$, $p < 0.10$). Overall, we find a strong

and robust age moderation for the relationship between a firm's strategic choices of diversification and acquisition and its likelihood of an IPO. our investigation revealed that younger firms are more likely to go public with less diversification and more acquisitions, whereas older firms are more like to go public with more diversification and relatively fewer acquisitions. The discussion section elaborates on potential theoretical explanations for age moderation.

4.4.4 Robustness Tests

We subjected our findings to a number of robustness checks. First, we excluded unicorn ventures founded during the dot-com bubble (1998-2000) and dot-com bust (2001-2003), as well as unicorn ventures founded during irrational exuberance (2007) and irrational exuberance bust (2008-2009), to investigate the possibility that unicorn ventures founded during these periods were somehow systematically different. And our results still hold. Second, we evaluated the results for H2 and H4a by re-estimating our model using the total number of industries (NOI). We find that NOI has a negative effect on the likelihood of IPO of unicorn ventures and the interaction term is significant. Third, we consider several alternative models for our analyses. Results using the Probit Models are consistent with our main findings. Our findings also hold up to the following alternative model specifications: Adding founder sex and race as additional control variables and including a control variable number of activities indicating venture's media exposure.

4.5 Discussion

This study adds to the literature by examining how diversification and acquisitions of younger and older unicorn ventures have different influence on their likelihood of an IPO.

The findings also highlight the critical role of firm age in establishing legitimacy and knowledge learning. Our results show that a younger unicorn venture will benefit from a narrower scope given their server resource constraints and lack of infrastructure, nevertheless, as a venture evolves and becomes more established, it will benefit from a broader scope. In addition, it appears that acquisition made in early year have a greater impact on a unicorn venture's performance. The robustness of the finding is underpinned by a large number of robustness checks, as well as by the population character of the data reducing concerns about selectivity. In our case, the results hold for the population of U.S. unicorn ventures.

Our primary contribution comes from linking firm age to the unique challenges that entrepreneurial ventures face – the tradeoff between realizing the benefits of legitimacy built over time and risking falling behind the industry life cycle. We contribute to the growing literature on the paradox of legitimacy, which suggests that the legitimacy of a firm resides in the eyes of its stakeholders and, as a result, is not stable and must be adjusted based on the type of audiences (Fisher et al., 2017; Garud et al., 2014; Zhang & White, 2016). Researchers have therefore argued that the effect of the legitimacy of a firm is contingent on the timing of assessment (Fisher, 2020). Our results for Hypothesis 1 and 2 suggest that a unicorn venture needs time to build legitimacy, however, as it grows older and more established, focusing on maintaining earned legitimacy limits the its ability in developing legitimacy in new technology or markets. The inverted-U curve of age on the likelihood of an IPO demonstrates that there is a time window for unicorn ventures to maximize their return on opportunity exploitation.

Furthermore, our findings offer new ways of integrating the entrepreneurship and organizational ecology literature. In the last decade, several scholars have started to look at firm diversification from an organizational learning perspective (Kotha et al., 2011; Xie & O'Neill, 2014). According to this viewpoint, firms operating in a variety of settings are exposed to a wide range of events and ideas that help to strengthen their knowledge base and technological capabilities. However, the entrepreneurial literature suggests that new ventures are subject to liability of newness and may not have the luxury of expanding their scope (Delmar & Shane, 2004). Our findings point to a more dynamic view of diversification, in which an entrepreneurial firm should focus on their chosen fields in their early life to benefit from technology leadership and first-mover advantage, and then gradually expand to new fields to keep up with the technological and market changes.

We also complement the acquisition literature (Teerikangas & Thanos, 2018) by examining the timing aspect of acquisition. While firms can learn through acquisition (Vermeulen & Barkema, 2001), we show the importance of doing it early. Thus, we highlight practical implications for entrepreneurial firms, particularly those planning an IPO. Given that the target firms are typically young startups, a younger unicorn venture may have more organizational similarity and less structural inertia to reconfigure resources and integrate new capabilities. In addition, early acquisitions boost the growth of the acquirer and shorten the time to market, which is critical for ventures at pre-IPO stage.

We acknowledge several limitations to our study. Because we were interested in studying the IPO of unicorn ventures as a very general phenomenon, we included a very wide variety of organizations and industries in our sample. There is a trade-off in this approach. Prior research has clearly demonstrated that a variety of industry-level dynamics

may shape the chance of IPO of entrepreneurial firm. Although we investigated the number of industry groups, we were unable to control for a set of industry characteristics that population-level studies suggest might be important. In addition, our examination of acquisition is limited to the numbers of acquisition. Further study could extend our study by exploring different types of acquisition, for example, horizontal vs vertical acquisition, as well as the impact of the dollar amount of acquisition transactions.

CHAPTER 5

CONCLUSION

This dissertation extends the entrepreneurship literature in a number of ways. The first essay extends the literature by offering empirical evidence that the impact of social capital on new venture survival is different in the early stage versus later stage of venture development. By doing so, we provide evidence to explain why an entrepreneur's social network changes over time (Vissa and Bhagavatula, 2012). Furthermore, the exploration of the effects of the strategic choices of the founder on the new venture survival is one of the first systematic studies to address the differences between the impact of the hybrid and full-time entrepreneurs. Additionally, this study expands the international business literature (Lampert et al., 2019, Scillitoe and Birasnav, Forthcoming) by shedding new light on the country-level differences that affect the survival of new ventures.

The second essay attempts to integrate the insights from several streams of prior research including resource-based theory, entrepreneurship literature, and CVC literature, to empirically examine the role of founders' prior entrepreneurial experience, IP and CVC on the likelihood of becoming a unicorn venture. Our findings suggest that experienced entrepreneurs have advantages in creating unicorn ventures. However, founders' capabilities can possibly be a substitute to the capabilities of CVC investors when entrepreneurs appropriate their IP to create unicorn ventures. Our results also suggest that the role of CVC in assisting entrepreneurs to create unicorn ventures is more nuanced than what prior literature suggests. We extend Dushnitsky and Lenox (2005)'s assertion that large corporations use CVCs to source innovative ideas to supplement their innovation efforts.

The findings of the third essay highlight the critical role of firm age in establishing legitimacy and knowledge learning. This study finds an inverted-U relationship between firm age and the likelihood of an IPO. The transition from a positive to a negative association between firm age and the likelihood of an IPO occurs between 12 and 15 years, implying that a unicorn venture has a limited window for an IPO. Furthermore, the results show that a younger unicorn venture will benefit from a narrower scope given their server resource constraints and lack of infrastructure, nevertheless, as a venture evolves and becomes more established, it will benefit from a broader scope. The contribution of this study comes from linking firm age to the unique challenges that entrepreneurial ventures face – the tradeoff between realizing the benefits of legitimacy built over time and risking falling behind the industry life cycle.

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