5-2019

Accelerators: Their Fit in the Entrepreneurship Ecosystem and Their Cohort Selection Challenges

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ACCELERATORS: THEIR FIT IN THE ENTREPRENEURSHIP ECOSYSTEM AND THEIR COHORT SELECTION CHALLENGES

by

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A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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This manuscript has been read and accepted for the Graduate Faculty in Business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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ABSTRACT

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The entrepreneurial financing landscape has drastically evolved over the past two decades with many of the new entrants (e.g., crowdfunders, accelerators, incubators, etc) rapidly rising to prominence (Block et al., 2016). Evolving from the incubator model, startup accelerators have similarly gained traction over the past decade (Pauwels, Clarysse, Wright, & Van Hove, 2016). While the number of published articles focusing on accelerators has been growing, extant research has yet to clearly delineate the accelerator phenomena conceptually and more importantly, empirically examine its selection mechanism. This dissertation addresses this gap and is composed of two parts. In the first part, I will introduce a conceptual model that explains where accelerators fit in the venture creation pipeline and how different types of accelerators create unique value in the respective entrepreneurial ecosystem. Second, given the significant role played by social startups in contributing to the broader society, I will focus on one important but under-researched type of accelerator – the Social Impact Accelerator (SIA) - to empirically examine its selection criteria and highlight how the founder's gender influences the economic and social signals sent by the social startup.

ACKNOWLEDGEMENT

This dissertation reflects years of my work devoted to the startup accelerator area and years of my rigorous doctoral education in the Zicklin School of Business at Baruch College, City University of New York.

I am most grateful to my committee Chair Professor, Ramona K. Zachary, who has witnessed my entire Ph.D. journey from my early-stage struggles and late-stage accomplishments and transformation. I deeply thank her for being very understanding, kind, and supportive. Without her support and understanding, this dissertation would not have been possible.

I would like to thank my committee member, Professor Romi Kher, who has spent the most time with me in the last four years to direct this dissertation, who always encourages me to think entrepreneurially and to be fearless, and who helps me always stay focused.

To Professor Thomas S. Lyons, who is my "outside" committee member, and who shares common research interests in the entrepreneurship ecosystem and community development, many thanks. It has been a great pleasure collaborating with him on research projects and I have greatly benefited from his rigorous academic attitude and extensive industry experience.

In addition, special thanks to Professor Scott L. Newbert, Lawrence N. Field Chair in Entrepreneurship, who has not only financially supported me to present my research in multiple national entrepreneurship research conferences, but also spent a great amount of time to mentor me over the last two years. Without his guidance and mentorship, I would not have become the independent entrepreneurship researcher I am proud to be today.

To Professor Karl Lang, Executive Officer of Ph.D. Program in Business at Baruch, thank you for your patience and kindness in helping me solve administrative issues.

I would also like to thank my parents Jian Yang and Xiaomin Wang, for their unconditional love, trust and support, and for their unbelievable understanding and patience. Thank you both for having such strong faith in me. I am very proud to be your daughter.

My life-time friends and collegial colleagues, Dr. Bin Ma and Dr. Zhu Zhu, thank you two for staying around and for being always positive and supportive.

Last but not least, Dr. Damiano Zanotto, my fiancé, my life partner and my best friend, thank you for being so strong-minded. Seeing your continuous pursuit and achievements in academia has strengthened my faith in this career and I am grateful to have you by my side.

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CHAPTER 1 INTRODUCTION

1.1 Background Information

Entrepreneurship finance landscape has drastically changed over the last two decades as many new players (e.g., crowdfunding, accelerators, and family offices, etc) have entered the arena (Block, Colombo, Cumming, & Vismara, 2017). Evolving from the incubator model, startup accelerators have gained traction over the past ten years (Pauwels, Clarysse, Wright, & Van Hove, 2016). Since the formation of Y-Combinator, widely considered to be the first accelerator, 170 US-based accelerators invested in more than 5,000 US-based startups with a median investment of $100,000 from 2005 to 2013., These companies raised a total of $19.5 billion in funding during this period (Hathaway, 2016). This accelerator phenomenon is also growing globally. According to the Global Accelerator Report (2016), more than 200 million dollars was invested into 11,305 startups by 579 accelerator programs across five global regions in 2016. F6S.com, a website that provides services to accelerators and similar startups programs, listed over 7,000 accelerator programs worldwide at the end of year 2017.

Similar to incubators, accelerators help startups define their ideas, build their initial prototypes, identify promising customer segments, and provide networking opportunities to external investors and industry experts. But distinct from the traditional incubation model that charges clients a space rental fee, accelerator programs provide small amounts of seed capital to selected startups in exchange for their equity meant to "accelerate" the venture creation process. These selected startups have only several weeks or several months to complete this process, and are then expected to present their final pitch to a large audience of qualified investors on their "Demo-Day" to graduate (Cohen, 2013). As the newest type of startup assistance organization in the entrepreneurship ecosystem, which bridges the funding gap for startups and information gap for external investors, accelerators have gained acknowledgement as the key contributor to the rate of business startup success (Dempwolf et al., 2014) and regional economy development (Hochberg & Fehder, 2015; Hochberg, 2016). People who advocate for accelerators compare them to business schools in the second half of the 19th century, arguing that the emergence of business schools back then was due to the educational need for professional managers, and in the same vein, the emergence of accelerators nowadays is due to the educational need for preparing nascent entrepreneurs to be more competent in venture creation.

Along with practitioners, scholars have also noticed this emerging trend and realized the critical role accelerators play in the startup ecosystem (e.g., Block et al., 2017). A growing body of accelerator studies has explored the definition and domain of accelerators (e.g., Cohen, 2013), the boundary between accelerators, incubators and equity investors (e.g., Cohen, 2013; Hochberg, 2016), and the different types of accelerators (e.g., Pauwels et al., 2016; Dempwolf et al., 2014). Research has also explored preliminary "acceleration effects" on cohort companies (e.g., Battistella et al., 2017; Hallen, Bingham, & Cohen, 2014; Cohen, Bingham, & Hallen, 2018) and regional entrepreneurship ecosystems (e.g., Hochberg & Fehder, 2015; Hochberg, 2016). Table 1 provides a detailed overview of academic research on accelerators published in the last decade.

1.2 Problem Statement

After reviewing accelerator literature, I identify three trends in this research area: First, the number of published articles focusing on accelerator research has been growing, especially in the last three years, indicating increasing interest from more scholars. Second, the term "accelerator" has become an umbrella term that includes different accelerator types (e.g., private for-profit seed accelerators, university-based accelerators, corporate accelerators, and social impact accelerators); however, the development of each type of accelerator is imbalanced as private for-profit accelerators and corporate accelerators have attracted relatively more attention, leaving social impact accelerators and university-based accelerators unexamined (e.g., Kohler, 2016; Kanbach & Stubner, 2016; Weiblen & Chesbrough, 2015; Gonzalez-Uribe & Leatherbee, 2017). Third, although a different typology of accelerators has been identified and proposed (Dempwolf et al., 2014; Hochberg, 2016), extant research has not either clearly differentiated these accelerators conceptually or empirically examined their different impacts on both startups and broader entrepreneurship ecosystems.

To advance our understanding of this accelerator phenomenon, my dissertation will be composed of two main parts: 1) I will introduce a conceptual model that is able to explain where accelerators fit in the venture creation pipeline, and through application of this conceptual model I will further explain how different types of accelerators create unique value to startups in the entrepreneurship ecosystem; and 2) Given the significant role played by social startups in contributing to the broader society, I will focus on one important but under-researched type of accelerator — Social Impact Accelerators (SIAs) — which aim to bridge the "pioneer gap" (Lall, Bowles, & Baird, 2013) between social startups and cautious impact investors (for example, corporate philanthropists).

1. 3 Dissertation Structure

My dissertation will follow the structure as follows:

In chapter 2, I will provide a comprehensive literature review of accelerators and propose a revised definition of the accelerator. Current definitions of accelerators are fragmented, and lack of a united theoretical base leads to boundary confusion. I apply the Entrepreneurial Venture Creation Theory (Mishra & Zachary, 2014) to identify the position and defining features of accelerators, to differentiate accelerators from other similar institutions such as incubators and venture capitalists, and to propose a revised definition of the accelerator. Moreover, my proposed dual-role conceptual model could also help people understand the heterogeneity among different accelerators.

In chapter 3, I will conceptually discuss three existing subsystems that have direct influences on entrepreneurs in the entrepreneurship ecosystem — the supporting subsystem, the financing subsystem, and the incubation subsystem (Dee, Gill, Weinberg, & McTavis, 2015). Then, I will elaborate where accelerators fit in and map how these different subsystems systematically help startups move up from the pre-startup stage to the early-startup stage (Lichtenstein & Lyons, 2006). More specifically, I will also explain how different types of accelerators should be designed differently based on their positions in the pipeline and unique values that they can bring to their selected startups.

After I have discussed values of different types of accelerators, in chapter 4, I will focus on one specific type of accelerator,SIAs, and empirically examine their selection results. It is interesting to investigate how institutions that are embedded with two competing logics (like SIAs) of pursuing both economic outcomes and social outcomes make selection decisions. Questions to be addressed include: Do accelerators unconsiciously prefer one over another, or do they have very independent and parallel selection logics? Which type of social startup is more likely to be selected, and why? Do accelerators' selection results match their selection logic? In this chapter, I will first introduce signaling theory and gender role congruity theory, develop moderation hypotheses, and then empirically examine 2,324 social startups that applied for 123 accelerators worldwide in 2016 and 2017 by using the Entrepreneurship Database Program initiated by Emory University and Aspen Network of Development Entrepreneurship (ANDE). I believe my findings will make theorectial contributions to both signaling theory and accelerator research. I also hope my study will reveal practical meanings to both social entrepreneurs who attempt to use institutional intermediaries to bridge the investment gap strategically and SIAs who are interested in improving their venture development performance.

In the last chapter, chapter 5, I will summarize my findings from each chapter and also discuss limitations and future research opportunities in this area.

1.4 Contribution and Significance

There are three main theoretical contributions my dissertation seeks to make. First, in general, this study contributes to accelerator literature by delineating and reconceptualizing the boundary of this new form of institution. Moreover, my study helps people understand the unique values brought by (different types of) accelerators to the entrepreneurship ecosystem along the venture creation pipeline. It is important for young entrepreneurs who are seeking to form strategic alliances with powerful and legitimate partners to secure their resources and overcome their "liability of newness" (Stinchcombe, 1965) despite feeling confused about where to start. My dissertation strives to provide a visual map for young entrepreneurs to make the important decision to choose their resource providers at very early stages. I attempt to answer questions that are frequently asked by young entrepreneurs, such as: Should we seek out an incubator or an accelerator, and when? Which type of accelerator should we consider? Given the time and efforts that young entrepreneurs need to devote to accelerators' application processes, I would strongly suggest they be mindful and choose the accelerator that suits their startups' needs the most. Otherwise the mismatching between startups and their accelerators will cause wasted time and resources.

Second, my dissertation contributes to signaling theory (Spence, 1973) by revealing the moderation effect of gender stereotype bias on signaling effects. Since Spence's (1973) seminal work, signaling theory has been widely applied in many scenarios across a broad range of disciplines (BliegeBird & Smith, 2005; Connelly et al., 2011), and the entrepreneurship area, a typical type of an asymmetric market in which exchange parties entrepreneurs/startups and outside investors do not have equal information in terms of a startup's latent quality, serves as an appropriate setting to apply signaling theory. My dissertation enriches signaling theory and highlights the cognitive perspective of signals and their interpretation. Drover, Wood and Corbett (2017) state that "the vast majority of research on organizational signaling tends to investigate the ways in which a positive signal — in isolation — influences the decision-making of external constituents (p. 2)" and point out the flawed fundamental assumption of most prior organizational studies that apply signaling theory — the assumption that all signals are noticed equally by everyone, and signaling interpretations by organizational evaluators are rational and unidirectional. This trend in fact limits the explanatory power of signaling theory because in the complex organizational context, decision-makers often attend to and need to interpret competing signals. Although I could not directly test the cognitive effects of social impact accelerators (SIAs) due to the limitedness of the data, my study counters this trend and indicates how "perceived incongruity" of signals will moderate the signal effects on SIA selection results.

Last but not least, this study also contributes to social entrepreneurship literature. Although social entrepreneurship research has gained traction in the last decade, social entrepreneurs are still facing more challenges than commercial entrepreneurs. Given the resource-poor condition, social entrepreneurs might need more external resources to help them take off. Chapter 4 of my dissertation examines a specific type of accelerator, social impact accelerator, which focuses on helping ventures that are driven by their social missions. However, the moderating effects of gender stereotypes on signals suggest that it is unavoidable that SIAs are embedded with subconscious biases, and these ingrained gender stereotypes will significantly influence their final selection results. The empirical findings described in chapter 4 reveal that in order to be selected by SIAs, social startups need to communicate both types of signals, economic signals and social signals, to SIAs parallelly. However, social entrepreneurs also need to be careful, because information (e.g., gender of the entrepreneurs) may unintentionally interfere with the signaling interpretation process and distort the intended meaning of signals.

CHAPTER 2 THE DUAL-ROLE MODEL OF ACCELERATORS: REDEFINITION AND RECONCEPTUALIZATION

The definition and domain of accelerators remains unclear to most scholars and practitioners. Some scholars argue that the accelerator model is an extension of earlier incubator models (e.g., Pauwels et al., 2016) and the most salient feature of accelerators is its intensive time frame (several weeks to a couple of months) (Cohen & Hochberg, 2014). Conversely, other scholars argue that accelerators function more as equity investors whose goals are financial return, rather than charging space fee. However, most arguments focus on delineating those observable forms or operational features adopted by accelerators, rather than unveiling their core essence. To the best of my knowledge, no united theoretical explanation so far has been proposed to clearly delineate the boundary of accelerators and distinguish it from other similar domains and explain observable differences across accelerator programs.

In order to explore and clarify myths amid the accelerator phenomenon, this chapter will focus on delineating the accelerator's boundary by 1) distinguishing accelerators from other similar institutions (e.g, incubators, equity investors, etc) by applying the entrepreneurship ecosystem pipeline model (Lichtenstein & Lyons, 2006); 2) proposing a unified framework theoretically explaining the rationale of the existence of accelerators by borrowing the Entrepreneurial Value Creation Theory (Mishra & Zachary, 2014); and 3) differentiating variations across various accelerator programs by proposing a practical taxonomy. The goal of this chapter is to propose a theoretical base and to reconceptualize and redefine accelerators.

To do so, I will first review existing literature of accelerators and highlight its definition issues. I will then apply the Entrepreneurial Value Creation Theory to elucidate the rationale of the existence of accelerators and propose the *Dual-Role* theoretical model. Last, I will apply this

Dual-Role model to explain wide variations found across different accelerator programs and redefine the accelerator.

2.1 Definition Issue of Accelerators

Given the newness of the accelerator phenomena, there is little published research on accelerators (Cohen & Hochberg, 2014). Most known literature focuses on clarifying the definition of the accelerator (e.g., Cohen, 2013), identifying its characteristics (e.g., Cohen & Hochberg, 2014; Radojevich-Kelley & Hoffman, 2012; Dempwolf et al., 2014), tracking their impacts on startups (e.g., Winston-Smith & Hannigan, 2014), and ecosystem development (e.g., Hochberg & Fehder, 2015; Winston-Smith & Hannigan, 2014). However, people still generally feel confused about the accelerator due to its similarities to other institutions (e.g., micro-enterprises, incubators, small business development centers, angel investors, and other equity investors, etc) and its heterogeneity across different accelerator programs.

Although some scholars consider the accelerator model as a special extending and evolving model from the incubator model (e.g., Pauwels et al., 2016), most researchers endeavor to define the boundary of the accelerator by delineating it from the incubator model and other similar institutions (e.g., Cohen, 2013; Cohen & Hochberg, 2014; Dempwolf et al., 2014). For example, Cohen (2013) proposed a working definition of accelerator, which is "a fixed term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo-day." Based on this definition, Cohen and Hocheberg (2014) stated that "perhaps the most fundamental difference is the limited duration of accelerator programs compared to the continuous nature of incubators and angel investment (p.4)." To distinguish accelerator programs from accelerator entities, Dempwolf, Auer, & D'Ippolito (2014) modified this definition by focusing on their business models and defined the accelerator program as "business entities that make seed-stage investments in promising companies in exchange for equity as part of a fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event, or demo-day (p.27)."

Additionally, scholars also acknowledged that there are great variations shown across different accelerator programs. For example, Cohen and Hocheberg (2014) pointed out "such programs may be for-profit or non-profit, and may vary in the amount of stipend, the size of the equity stake taken, the length of the mentorship and educational program, the availability of co-working space and in industry vertical focus. Some are affiliated with venture capital firms or angel groups, some with corporations, and other within universities or local governments or non-governmental organizations (P.5)." Dempwolf et al (2014) categorizes accelerator programs into three broad categories; they are 1) university accelerators, which are "educational nonprofits," 2) corporate accelerators, whose goal is to gain competitive advantage for the corporate parents, and 3) innovation accelerators, which are stand-alone, for-profit ventures. After investigating 13 accelerators, Pauwels and his colleagues (2016) identified five key design building blocks to categorize accelerators into the "ecosystem builder," the "deal-flow maker," and the "welfare stimulator."

However, the definition issue remains because none of these definitions or approaches is sufficient to fully explain the accelerator's function and its impact on startups. Although Cohen's definition clearly states four distinguishable characteristics of accelerators from the operational perspective and emphasizes the services and educational component provided to those entrepreneurs at early stage (which can be used to differentiate accelerator from angel investors), it does not mention the financial support and engagement from accelerators. One of the most important features of accelerators is to provide necessary funds to help startups grow

(Radojevich-Kelley & Hoffman, 2012), despite whether accelerators are for-profit or whether they take equity from startups. As Hathaway (2016) specifies, "Startup accelerators support early-stage, growth-driven companies through education, mentorship, and financing." Cohen and Hochberg (2014, p.13) also acknowledged that "while accelerators are often compared to incubators, they are more similar as angel investors." In contrast, Dempwolf, Auer, & D'Ippolito (2014) modified this definition by adding the "seed-stage capital provision" element, but their definition is so narrow that it is only limited to accelerators that seek equity exchange.

Additionally, extant comparative studies have not provided a clear delineation between accelerators and other similar institutions, which is understandable given that the conversation about the definition and domain of accelerator is still not settled. Although these comparisons indeed explain to some degree how accelerator programs are different from other similar institutions, they also add more confusion for practitioners/entrepreneurs as too many features are compared across these articles. More specifically, while some features are at operational level (e.g., duration, office provision, etc), some features are at design level (e.g., strategic focus, selection process, etc). These fragmented, solitary, and independent comparisons do not advance our understanding of this phenomenon by disclosing the fundamental differences among these institutions, since they do not examine the core differences embedded in initial designs, nor do they theoretically explain the uniqueness of accelerators. Only if scholars elaborate these differences from the deep, core, and design-level perspective can these surface differences can be philosophically aligned and logically explained, rather than simply being observed and listed. Only in this way nascent entrepreneurs can gain more understandings and know how to practice by comprehending the underlining logic of this accelerator phenomenon.

Thirdly, current literature only mentions the heterogeneity of different accelerator programs, without theoretically, systematically and logically explaining reasons why the heterogeneity exists and whether there are some coherences across all these heterogeneous programs. And if the answer is "yes," how can entrepreneurs understand this buried coherence and find the best suitable accelerator program? Further, how should accelerator managers design their programs in a more logical and effective way by aligning these different pieces all together?

To resolve all these three confusions, we need a unified and integrated theoretical framework within which we can place all discrepancies and see their interplay. I will apply the entrepreneurial value creation theory as this general framework to review, reconceptualize, and redefine the accelerators domain.

To begin, I will explain the core difference between accelerators and incubators in terms of their targeted users. Then I propose to review the entrepreneurial process through the lens of Entrepreneurial Value Creation Theory (Mishra & Zachary, 2014), and distinguish accelerators and other similar institutions in terms of their contributions to this value creation process. Next, I will illustrate why accelerator programs are heterogeneous from their operational model, and what main factors impact this heterogeneity. At the end of this chapter, I will propose an updated working definition based on the current definition proposed by Cohen (2013).

2.1.1 Startups' "readiness"

Generally, all these three institutions can be simply perceived as supportive organizations for potential early-stage ventures; however, they have different selection criteria when they select specific "potential" startups. In this section, I propose that the startup's "readiness" is another influential selection criterion adopted by these institutions. While capitalists usually focus on these "potential and ready" startups, most literature suggests that, as early-stage startup supporters, incubators and accelerators focus more on those “potential but not ready yet” startups.

To differentiate accelerators from incubators, we need to ask a deeper question: What does “not ready yet” mean? Is the implication that they are not ready in general, or that they are not ready in only some specific areas?

2.1.2 Two Dimensions of “not-ready”

Tech-not-ready Startups. This type of startup is still in its very early stage, in which their technology has not fully or sufficiently developed yet. The focus at this stage is to enhance the startup’s capability of developing its prototypes and making itsr products/service functional and commercializable. Due to their weakness and fragility at this sensitive stage, these startups need protection from trustworthy institutions to help them survive this phase.

Market-Not-Ready Startups. This type of startup is “not ready for market.” Usually this type of startup has a relatively complete concept of its product/services, and most of the time they already have prototypes. They are still at their early stage because their products/services have not been tested or have not yet connected to market/potential users.

As Cohen and Hochberg (2014) mentioned, “Philosophically, incubators are designed to nurture nascent ventures by buffering them from the environment, providing them room to grow in a space sheltered from market forces. Accelerators, in contrast, are designed to speed up market interactions in order to help nascent ventures adapt quickly and learn.”

2.2 Entrepreneurial Venture Creation Theory

Acknowledging that the process of value creation is central to the conceptualization of entrepreneurship, Mishra and Zachary (2014) define entrepreneurship as “a process of value creation and appropriation led by entrepreneurs in an uncertain environment (p.5).” They posit that the desire for entrepreneurial reward, instead of greed, drives entrepreneurs to create wealth, which benefits all individuals who participate in entrepreneurial activities. By integrating multiple theories, they provide this comprehensive and unified theory, namely, the Entrepreneurial Value Creation Theory. This theory divides the entrepreneurial reward pursuit process into two stages. Stage 1 is “Formulation,” which refers to early and nascent processes which entrepreneurs use to fully develop their entrepreneurial competencies in order to enter into the next stage — “Monetization,” which refers to venture capitalists stepping in to the realization of the entrepreneurial reward (e.g., acquisiton or IPO). They also point out that most failures happen during this transition because not all nascent entrepreneurs are capabable of developing their entrepreneurial competencies.

In general, entrepreneurial competence should be fully developed in the first stage, including both product developmental capability and market access capability. It embeds the entrepreneurial resources including the entrepreneurs’ human capital, social capital, family capital, emotional capital, and knowledge capital.Those resources are modulated by entrepreneurs’ intentions. Through entrepreneurs’ effectuation efforts, they will adjust and adapt their recognized opportunitities to match their resources and intentions. This formulation process will iterate several times until entrepreneurs’ competencies are fully developed and enter into the monetization stage. Many ventures may fail during stage 1, so they do not even have a chance to move on to stage 2.

In stage 2, the entrepreneurial competence is linked to the due diligence modulator and the business model multiplier. The due dilligence modulator evaluates and qualifies the entrepreneurial competence before an investment can be made. Since entrepreneurs tend to signal their entrepreneurial ability, the due dilligence modulator screens and qualifies the venture to protect the investors from adverse selection risks.

This framework does not only disclose this dynamic entrepreneurial process, including effectuation, iteration and screening; it also suggests reasons why startups fail before they realize entrepreneurial reward. First, most startups fail in developing their competencies in the first stage because they cannot unify their intentions, resources, and recognized opportunities together through the effectuation process. Those startups cannot even transition from stage 1 toe stage 2 successfully. Second, even though some startups are competent enough to enter into stage 2, they are still highly likely to fail to convince investors due to information asymmetry and adverse selection. Thus, we can presume that for nascent entrepreneurs, succesffuly transitioning from stage 1 to stage 2 is a critical milestone in their entrepreneurial value creation process.

Apparently, venture development organizations (VDOs) such as incubators, technology transfer centers, and small business development centers, focusing on providing services to help nascent entrepreneurs, iterates their formulation processes in stage 1 (e.g., Aerts, Matthyssens, & Vandenbempt, 2007; Allen & Rahman, 1985; Bergek & Norrman, 2008; Chan & Lau, 2005). While entrepreneurial financing literature focuses on explaining impacts and effects of external investors (e.g., individual angels, venture capitalists, and corporate venture capitalists, etc) on startups' performance and future (Baum & Silverman, 2004; Bertoni, Colombo, & Grilli, 2011; Eckhardt, Shane, & Delmar, 2006),the emergence of accelerators fills the void between stage 1 and stage 2 because they serve nascent entrepreneurs as a professional school, providing them nessary training sessions to accelerate their formulation process and also playing a role as the first external investor to provide a small amount of seed capital to help these competent entrepreneurs release their positve signals to other investors and attract funds.

2.3 Dual-Role Model of Accelerators

As the "bridge" helps startups increase their survival chances from stage 1 to stage 2, accelerators need to have this "dual-role" feature (being the "educator" and "investor" simultaneously) in their design. While the educator role focuses on enhancing startups' market competencies, the investor role focuses on enhancing their fundraising capability to scale up.

Educator Role: This role derives from incubator models that provide entrepreneurs or startups necessary support, such as mentorship, bootcamps, business model training sessions, as well as network support. One mission of the accelerator is to enhance entrepreneurs' competencies and prepare these potential but "not-ready-yet" startups to be ready for their next stage.

Investor role. Accelerators also need to undertake the investor role. They provide training opportunities and resources to these selected startups or entrepreneurial teams, and then they will be the first angel investor in their portfolio startups. Generally, the seed money provided by accelerators ranges from $20,000 to $100,000.

One key note is that institutions need to meet this "dual-role" criteria to be qualified as accelerators. If they only have one role, they then fall into either the incubator-alike model or the investor-alike model. To be qualified as an accelerator, they need to have these operational features from both roles. In other words, accelerators should function as a combination of both the incubator model and the venture capital model.

This "dual-role" feature cannot differentiate accelerators from other similar institutions, but it can explain the within-group heterogeneity across different accelerator programs. Simultaneously possessing both roles does not mean that all accelerators must place equal focus or preference on each role. According to their missions, goals, and design logics, accelerators have different preferences within this “dual-role” scale (e.g, some accelerators might choose to be “20% educator plus 80% investor,” while others might choose to be “50% educator plus 50% investor.” Accelerators’ different focuses and preferences within their “dual-role” lead to this cross-program heterogeneity.

The question is, why do some accelerators choose to be “20% educator plus 80% investor” while others choose to be “50% educator plus 50% investor”? I propose that this choice is influenced by another two design features of accelerators: 1) for-profit vs. non-for-profit and 2) equity-taken vs. non-equity-taken

Based on these two features, I have developed this 2x2table to illustrate how accelerators’ preferences on “dual-role” will be embodied by the interactions of these two design features.

In Figure 2, we can categorize our known accelerators into four boxes according to whether they take equity from startups and whether they are for-profit organizations.

Accelerators that fall into the first box are non-for-profit accelerators that do not take equity from their cohort startups. On their dual-role continuum, these accelerators focus primarily on its educational goals. Most government-based accelerators and university-based accelerators fit in this category. They have relatively stable and secure funding sources from the government or their corporate partnership, which provide grants or awards to winning teams on Demo-Day. The Mass Challenge and the StartX are two examples of this type.

Accelerators that fall into the third box are for-profit accelerators who take equity from their startups. Apparently, these accelerators focus more on their investor role than the educator role. The reason that they provide intensive training sessions and other services to startups is to accelerate the startups venture creation process. They can only make revenue out of it when startups exit either through acquisition or through IPO. Almost all these well-known seed accelerators belong to this category, such as Y-combinator, TechStar, and 500 Startups.

A third type of accelerators are non-for-profit but also seek for equity exchange, which falls into the second box. Since part of their revenue is from their fund providers, and part of their income is from startups' exit performance, they have a more balanced educator and investor role. For example, University of Chicago New Venture Challenge falls into this category.

Since I have not found any existing accelerator that is for-profit but not seeking equity exchange, I will leave this category blank for now. But I predict that perhaps in the future, there might be some new form of accelerators adopting innovative business models to be profit-driven without seeking equity exchange from their accelerated startups.

Prior literature mentions the difficulty of accurately evaluating the efficacy of accelerator is due to their newness and their heterogeneity. Given the complexity of accelerators' phenomenon, it is important to distinguish them more specifically in terms of their preferences on their dual-role choice, especially regarding the comparison among different programs. It will be considered as unfair if we evaluate type I, II and III accelerators based on the same criteria. For these investor-role driven accelerators who are seeking equity exchange, their performance will directly depend on their cohort startups exit performance, such as the proportion of cohort startups successfully exiting and realizing potential value. For equity-exchange accelerators, their investment can only generate returns when their cohort startups realize their valuation by being acquired or going IPO. Therefore, the exit speed and exit valuation weigh much more than other performance indicators like the scale of alumni startups or the surviving rate of startups. Counterintuitively, these accelerators might be afraid of seeing "surviving but without any growing or exit potential" startups in their portfolio. The number of startups they accelerated, the surviving rate of these startups, or how many jobs are created by their startups, are not their concern. However, it will be more important for those non-for-profit accelerators to measure their impact in a broader sense rather than focusing on financial return. For example, MassChallenge is a well-known non-profit accelerator that is supported by the government. It receives funding from global partnerships with big corporate foundations such as JP Morgan Chase Foundation and IBM, etc[1]. Since it is "designed to help startups win," it identifies itself as "startup-friendly" and does not take any equity from startups. In Mass Challenge's recently published impact report, they clearly mentioned that they "…passed a milestone of accelerating over 1,000 startups—1,211 in total. Our alums have raised over $1.8 billion in funding, generated over $700 million in revenue, and created 60,000 direct and indirect jobs." Apparently, those non-for-profit accelerators put more attention on the scale of cohort startups, the amount of jobs created directly and indirectly, and cohort startups revenue and survival rate.

To summarize, Figure 3 demonstrates the integrated conceptual map to differentiate accelerator from other similar institutions and explains the internal heterogeneity across accelerator programs.

Thus, extending Cohen's definition of accelerator through the Entrepreneurial Venture Creation theoretical lens, I redefine the accelerator as:

A fixed term, cohort-based program aiming at enhancing startups' competency. Besides receiving mentorship and education, selected teams (in for-profit accelerators) or winning teams in a public pitch event or demo-day (in non-for-profit accelerators) will receive a small amount of seed capital.

[1] http://boston.masschallenge.org/faqs

Compared with Cohen's definition, this revised definition emphasizes the dual-role accelerators undertake to help early-stage startups and also mentions two critical features that will influence accelerators' choices on their preference of the "dual-role." I agree that some of them might focus more on their educational role (Mass Challenge, StartX., etc) while others focus more on their investor role (Y combinator, and TechStars., etc), but a rigorously designed accelerator program should fulfill both roles at the same time. To be identified as "accelerators" they need to undertake both roles. The within-group differences will be embodied through their balance of deciding which role and to what degree this role should be emphasized in their operational models. (As Figure 3 showed below)

CHAPTER 3 WHERE DO DIFFERENT TYPES OF ACCELERATORS FIT IN VENTURE CREATION PIPELINE

On the basis of Entrepreneurship Venture Creation Theory, I proposed the "dual-role" model of the accelerators and update its general definition in Chapter 2. Chapter 3 will specifically focus on the position of each type of accelerators, and conceptually discuss their unique values to the entrepreneurship ecosystem and their accelerated startups.

First, I will introduce startup ecosystem in general, and its three interrelated subsystems. Then I will apply the Pipeline Model (Lichtenstein & Lyons, 2006) to explain how different types of accelerators are designed specifically to help early-stage startups with distinctive needs.

3.1 Startup Ecosystem

Startups are an important means by which new ideas are brought to life-especially those ideas that challenge established industries or do not find ready support inside existing companies. They are core to the process of creative destruction and crucial for increasing employment. They exert competitive pressure on prevailing businesses, which drives improvements in productivity and prosperity. In short, the starting-scaling of new ventures is vital for innovation and economic growth. However, due to the "liability of newness" (Stinchcombe, 1965), startups are also fragile, vulnerable and associated with extremely high risks of failing when they explore and exploit entrepreneurial opportunities.

An entrepreneurship ecosystem is defined as "an interconnected group of factors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures" (Cohen, 2006, p. 3). Scholars who hold this view propose that building a strong, mature and sustainable entrepreneurship ecosystem is crucial for economic development, because it can effectively help startups overcome the "liability of newness” to survive and scale (e.g., Cohen, 2006; Feldman, 2001; Lichtenstein, Lyons, & Kutzhanova, 2004; Mack & Mayer, 2016; Neck, Meyer, Cohen, & Corbett, 2004). This supportive environment view was also referred to as an “enterprise development strategy” by Koven and Lyons (2003), which is “…assistance to entrepreneurs in support of the creation, growth and survival of their businesses. (p. 100)” Extant research has identified a wide range of elements in the entrepreneurship ecosystem that have direct or indirect influences on new venture creation. For example, system components listed by Cohen (2006) include informal network, formal network, university, government, professional and support services, capital services, and talent pool. Focusing on high-tech entrepreneurial activities, Neck et al (2004) examined elements including incubator organizations, spin-offs, informal and formal networks, physical infrastructure and the culture.

To integrate and organize these distinct elements in a more united manner, Spigel (2015) identified three meta-types of ecosystem attributes: cultural, social and material, and he listed specific components under each one. For example, supportive culture and histories of entrepreneurs belong to the cultural dimension; work talents, investment capital, networks, and mentors and role models belong to the social dimension; and policy and governance, universities, support services, physical infrastructure and open markets belong to the material dimension. From the community developmental perspective, Lichtenstein and Lyons (2001) focus on entities that are called “service/assistance providers” (Lichtenstein & Lyons, 2001), or “venture development organizations” (VDOs) (Plummer, Allison, & Connelly, 2016). These include but, are not limited to, youth entrepreneurship programs, microenterprise programs, business incubators, manufacturing networks, entrepreneurship networks, small business development centers, angel capital networks, venture capital clubs and funds, revolving loan funds, SCORE chapters, and technology transfer programs, among others.

However, while simply listing or grouping these elements might help entrepreneurs understand what services these providers offer, how they function, and how the ecosystem operates, these lists do not help entrepreneurs better understand who they should come to for resource help, when they are at different stages of venture development. In this Chapter, I will first explain three main subsystems: supporting subsystem, financing subsystem and incubation subsystem. Then I will map these three subsystems by applying the Pipeline Model and illustrate how the main elements in these subsystems function consecutively to help entrepreneurs/ventures at different stages to move through the pipeline.

3.1.1 The Supporting Subsystem

A startup support subsystem comprises a variety of firms and organizations that provide ancillary services to new ventures (Spigel, 2015), like startup programs, industry associations/networks, legal services, accounting services, technical experts/mentors, and crediting agencies (Cohen, 2006; Kenney & Patton, 2005; Patton & Kenney, 2005). Two important features of organizations in this subsystem are: 1) they provide a variety of external services to startups, and they charge startups service fees, depending on the amount and the quality of services they provide; and 2) different service providers have a different service scope for new ventures. Some of these service providers only target early-stage startups, while others might focus on helping late-stage ventures. A few of them might provide a wide range of services through the entire life cycle of ventures. It is relatively easy to identify service providers based on their functions (e.g., legal advices, tax advices., etc), but it might be confusing when a diversity of startup programs emerges to provide services for nascent entrepreneurs at pre-venture phases, such as entrepreneurship courses, startup weekends, co-working spaces, competitions (Dee et al., 2015).

3.1.2 The Finance Subsystem

Startup finance subsystems provide external financial capital for startups at different stages and include a variety of financiers such as banks, private equity investors, venture capitalists, angel investors, foundations, microfinance institutions, public capital markets, development finance institutions, and crowdfunders (Bruton, Khavul, Siegel, & Wright, 2015; Cohen, 2006; Lichtenstein et al., 2004; Lichtenstein & Lyons, 2006; Motoyama & Knowlton, 2016; Spiegel, 2015). In general, there are two general types of financiers in this subsystem: debt financiers and equity financiers (Bussgang, 2014). Donors are a third type of financier, but because they have special expectations for their beneficiaries, I will not specifically discuss them in this paper. All ventures need financial capital to operate and survive, but not all financing tools are designed for early-stage startups. Debt financiers do not provide risk-adjusted capital, and they expect startups to have stable and predictable incomes so that they can pay their debts with minimum risk. So most debt financiers target late-stage startups, and so do institutional investors, who are purely growth-oriented. Some equity investors have higher risk tolerance, and they are willing to provide equity capital to startups that are still at a very early stage, for example, angel investors and venture capitalists. Similar to organizations in the support subsystem, players in the financing subsystem provide external financial resources to startups as well as services such as mentoring.

3.1.3 The Incubation Subsystem

Besides these external resource providers, entities in the incubation subsystem provide internal resources to their client ventures. This group includes a variety of organizations such as science parks, technology incubators, innovation centers and labs, and accelerators (Mian, Lamine, & Fayolle, 2016). Here I only focus on differentiating accelerators from incubators.

3.1.3.1 Incubators.

Incubators are property-based initiatives (Phan, Siegel, & Wright, 2005) providing their tenants with a mix of services encompassing infrastructure, business support services and networking (Bergek & Norrman, 2008; Hansen, Chesbrough, Nohria, & Sull, 2000; Lalkaka & Bishop, 1996). Unlike supporting systems and financing systems, which provide external assistance for startups, the incubation system was created to provide direct and internal assistance for young ventures. This system emerged in 1959 in New York, with the provision of affordable office space as its main services (Bergek & Norrman, 2008); then it became a popular tool in the 1980s to promote the creation of new technology-intensive companies (Lewis, 2001); and now it has evolved to be more network-focused (Scillitoe & Chakrabarti, 2010). In general, incubator institutions focus on assisting their client companies to improve their competency. General operational features include a not-for-profit structure, low-cost working space provision, flexible tenancy, and no financial investment in their client ventures (Allen & McCluskey, 1990; Hackett & Dilts, 2004).

3.1.3.2 Accelerators.

As an emerging incubation-like model, accelerators are created with features of both the incubation subsystem and the financing subsystem. Like incubators, accelerators help startups refine their ideas, build initial prototypes, identify promising customer segments, and provide networking opportunities to external investors and industry experts. But distinct from the traditional incubation models that are equity-free and charge their clients a space rental fee, accelerator programs provide small amounts of seed capital - $26k on average, with a range from

$0 to $150k (Hochberg, 2016) - to their selected startups in exchange for equity (typically 5% – 7%) with the purpose of "accelerating" venture development. Since accelerators only recruit startups once or twice in each year, the selection rate of accelerators is extremely low and they only consider "cohort classes" of startups.

Although I can identify these three subsystems in the entrepreneurship ecosystem, challenges regarding how to build up a strong entrepreneurship ecosystem remain. As Lichtenstein et al., (2004) pointed out, activities provided by different service providers are fragmented and categorical, because service providers tend to function in isolation of one another, and this isolation is reinforced by the fact that each provider has its own culture, jargon, operating practices, professional associations, performance standards, and funding streams. Therefore, only highly experienced and skilled entrepreneurs are able to integrate and navigate all these services smoothly. However, a vibrant entrepreneurship ecosystem not only includes high-skilled entrepreneurs, but also includes "rookies" who have just started their entrepreneurial journey. Most of the time, "rookies" look at these offerings as a maze, with no entry point and no clear exit (Lichtenstein et al., 2004).

3.2 The Pipeline Model

Lichtenstein and Lyons proposed the Entrepreneurial Development System (EDS) in 2001. They argue that to build up a sustainable entrepreneurship ecosystem/community, the key activity needed is to build up a cohesive and holistic development system for entrepreneurs that transforms them from "rookies" to "major leaguers" in terms of their skills. Four unique skills were identified: 1) *technical skills*: ability to perform the key operations of that business; 2) *managerial skills*: ability to organize and efficiently manage the operations; 3) *entrepreneurial skills*: ability to identify market opportunities and create solutions that capture those opportunities, and 4) *personal maturity*: self-awareness, willingness and ability to accept responsibility, emotional development and creative ability. Based on different levels of each skill possessed by entrepreneurs, they can be placed into five categories: rookies, single A, Double A, Triple A, and Major Leaguers, following the league system of American baseball. In addition, Lichtenstein and Lyons (2001) provide another guideline to help different service providers to be integrated into a holistic system, in which each provider can concentrate on what it does best and serve a particular entrepreneurial need at an appropriate level of development. Table 2 summarizes the entrepreneurial development level of different enterprise development assistance providers. It must be noted that the original EDS framework broadly views all players in the supporting system, incubation system and financing system as service providers, without distinguishing the different value added to young ventures at different developmental stages.

Following the EDS, Lichtenstein and Lyons (2006) operationalize the concept of a pipeline of entrepreneurs and enterprises (Pipeline Model) from a community economic development perspective by capturing both dimensions of entrepreneurial skill level and enterprise life cycle stage level. They state, "These two variables can be used to map the community's pipeline of entrepreneurs and enterprises, giving us a new set of lenses that enable us to shift from seeing an undifferentiated pool to seeing a pipeline consisting of variegated stocks and flows." (2006, p. 379).

This model incorporates three basic assumptions: 1) entrepreneurs are successful to the extent that they have the necessary skills, 2) entrepreneurs come to entrepreneurship at different levels of skill, and 3) entrepreneurial skills can be developed and refined. This skill variable can help us to differentiate an entrepreneur's "readiness" by analyzing their different skill sets. The other important variable identified by the Pipeline Model is the life cycle stage of the venture.

Using business life cycle theory, Lichtenstein and Lyons (2006) identify six consecutive stages for all ventures, from Stage 0 (Pre-Venture) to Stage 5 (Decline). Here I apply and extend the Pipeline Model to map players situated in these three subsystems, who aim at assisting entrepreneurs and ventures at early stages, from the *Pre-venture* (stage 0), *Existence or Infancy* (stage 1), to *Early Growth* (stage 2). Table 3 provides the definitions of each stage.

To capture nuanced differences in terms of added value provided by different service providers at early stages of startup, I follow Rotefoss and Kolvereid (2005) to identify two sub-phases within Stage 0, depending on the degree that entrepreneurs get involved in entrepreneurial activities. They are:

1) the aspiration phase—the potential entrepreneur shows his/her propensity to start a business. In this stage, most individuals have intention to become entrepreneurs, and they might have several entrepreneurial ideas, but they do not really get involved in any entrepreneurial activities; and

2) the preparation phase—it also is called the "nascent stage", in which sense making of information acquired during the attempt to assemble resources and actualize ideas takes place. During this stage, nascent entrepreneurs might talk with people about their ideas to evaluate their desirability and feasibility and start to discover the business model.

Figure 4 demonstrates how these different service/finance providers in each subsystem help entrepreneurs and their ventures to develop along the pipeline from the pre-venture stage and the early growth stage. I first follow Lichtenstein and Lyons (2006) and plot "entrepreneurial skills" on the y-axis and "stages" on the X-axis. Because I only focus on differentiating service/finance providers for early-stage startups, I only identify three stages on the X-axis.

There are two important implications of this map: 1) the incubation subsystem functions as the bridge, providing internal assistance to AA entrepreneurs, so that they can transform to the AAA level and move their ventures forward; and 2) although both incubators and accelerators belong to the incubation subsystem, their targeted clients are still slightly different in terms of their developmental levels. As Cohen and Hochberg (2014, p. 9) articulate, "philosophically, incubators are designed to nurture nascent ventures by buffering them from the environment, providing them room to grow in a space sheltered from market forces. Accelerators, in contrast, are designed to speed up market interactions in order to help nascent ventures adapt quickly and learn."

In the next section, I will focus on accelerators, and explain how different types of accelerators should be placed on this pipeline map.

3.3 Distinctive Types of Accelerators and Expected Outcomes

"Accelerator" is an umbrella term that includes many different formats, such as corporate accelerators (e.g., Kanbach & Stubner, 2016; Kohler, 2016; Weiblen & Chesbrough, 2015), private for-profit accelerators (e.g., Hallen, Bingham, & Cohen, 2014b), social impact accelerators (e.g., Gonzalez-Uribe & Leatherbee, 2017), and university-based accelerators (e.g., Mason & Brown, 2014; Wise & Valliere, 2014). After conceptually discussing their common functional features and the general benefits entrepreneurs can expect from them, scholars (Hochberg, 2016; Mason & Brown, 2014) point out that each type of accelerator operates following its own goals, design logics, and innate motivations. Therefore, they function differently by providing different services and contributing to the entrepreneurial ecosystem in different ways (Goswami, Mitchell, & Bhagavatula, 2018).

To better understand their commonalities and divergences, Pauwels and his colleagues (2016) conducted semi-structured interviews with the managing directors of 13 accelerators in Europe, and their findings suggest that all of these 13 accelerators' activity systems contain five design elements—program package, strategic focus, selection process, funding structure, and alumni relations. By examining details of these five design elements, they identified three main design themes of accelerators. These are: 1) *the ecosystem builder*, which primarily matches customers with startups and builds the corporate ecosystem (e.g. corporate accelerators), 2) *the deal-flow maker*, which focuses on identifying investment opportunities for investors (e.g. private startup accelerators), and 3) *the welfare stimulator*, which focuses on promoting startups and economic development (e.g., government-driven accelerators or university-based accelerators). However, they did not specify whether these three main types of accelerators seek to accelerate all early-stage ventures or have their own particular implicit preferences for ventures at a given stage of development.

Following their study, I propose that these three main types of accelerators have different focuses in terms of "whom" will be developed (entrepreneurs, ventures or both). Therefore, from the developmental perspective, participating in different types of accelerators might lead to different developmental effects on entrepreneurs and their ventures.

3.3.1 Deal-flow Makers

Funded by equity investors such as business angels, venture capital funds or corporate venture capital, deal-flow makers are primarily driven to identify promising investment opportunities for investors. Their selection logic is to "pick the winners", which are eligible for follow-on capital and have the ability to evolve into attractive investment propositions quickly (Pauwels et al., 2016). Hence, these deal-flow makers tend to focus on relatively later-stage startups that already have some proven track record. Many profit-driven standalone business accelerators belong to this type, for instance Y-combinator, TechStars, and 500 startups.

When I place deal-flow makers in the pipeline model, we can expect that the goals of these for-profit seed accelerators will most likely be venture-centered, focusing on venture development. They are not very interested in spending their energies, resources and time to develop or transform entrepreneurs to the next level; therefore, the expected outcome of participating or being selected by this type of accelerator is horizontal movement along the Y-axis.

3.3.2 Welfare Stimulators

According to Pauwels et al (2016), this type of accelerator typically has a government agency as a principal stakeholder. Similarly, non-profit driven university business accelerators (UBAs) also belong to this category. Unlike deal-flow makers, the primary objective of this accelerator type is to stimulate startup activity and foster economic growth. Because they typically select ventures in a very early-stage, even when a value proposition has not been fully developed, the education components of their services (e.g., curricula and training programs) are the most developed among all three types of accelerators.

When we place welfare stimulators in the pipeline model, we can expect that the goals of these for-profit seed accelerators will most likely be entrepreneur-centered, focusing on developing entrepreneurs' skills and strengthening the "supply side" of entrepreneurs in the regional entrepreneurship ecosystem. Because they are not commercialization-oriented, the expected outcome of participating or being selected by this type of accelerator is vertical movement along the X-axis.

3.3.3 Ecosystem Builders

Typically, this type of accelerator is established by large and existing companies for their own strategic reasons, for instance, gaining an understanding of current market developments and trends; further development and integration of the products and services from the startups; or evaluating innovative products and services that have the potential to be disruptive (Kanbach & Stubner, 2016). In general, parent companies want to develop an ecosystem of customers and stakeholders around their companies. This type of accelerator does not take fees or equity from their selected startups, but only those startups that are perceived to have the ability to contribute to corporate ecosystem development will have the opportunity to be selected (Pauwels et al., 2016).

Large companies have two kinds of expectations from their accelerated startups. First, they want to develop entrepreneurs by providing experiential learning opportunities, so that even if their new startups do not survive or become successful, these developed entrepreneurs might become potential employees in the company. Second, if these startups become successful, their frequent engagement in symbolic actions such as broadcasting, newsletters, and showcase events, will not only improve their own perceived legitimacy (Zott & Huy, 2007) but also strengthen the parent company's portfolio. Therefore, if we place ecosystem builders in the pipeline model, the expected outcomes would be different from either those of deal-flow makers or those of welfare stimulators. Compared with the other two types, the expected outcome of participating in or being selected by this type of accelerator should be movement toward the upper right-hand corner.

In Figure 5, I plotted these three types of accelerators in the pipeline model. The rectangular boxes represent where each of these three types of accelerators fit in the model, which also reflect their different selection logics and the variation in the startups they target. Following Pauwels et al's (2016) findings, I propose that welfare stimulators target comparatively lower-skilled entrepreneurs and earlier-stage startups, while deal-flow makers target higher-skilled entrepreneurs and later-stage startups. Then I use oval boxes to indicate the expected outcomes for these three types of accelerators. What I demonstrate is that while welfare stimulators aim to develop entrepreneurs, deal-flow makers aim to transform startups, and ecosystem builders expect to accomplish both.

CHAPTER 4 THE SELECTION OF SOCIAL IMPACT ACCELERATOR

As I mentioned in Introduction, the development of each type of accelerators is imbalanced such as private for-profit accelerators and corporate accelerators have attracted relatively more attentions, leaving social impact accelerators (SIAs) and university-based accelerators unexamined (e.g., Kohler, 2016; Kanbach & Stubner, 2016; Weiblen & Chesbrough, 2015; Gonzalez-Uribe & Leatherbee, 2017). In Chapter 4, I will focus on SIAs and empirically examine their selection results.

4.1 Introduction

Given the resource-poor condition of most entrepreneurs, startups often require external resources in order to survive and grow (Aldrich, 1999), especially social startups. Unfortunately, because startup accelerators emerged to support entrepreneurs in technologically-intensive industries (e.g., Hallen et al., 2014b), the needs of social entrepreneurs seeking early-stage support initially remained largely unaddressed (Lall et al., 2013). Yet, the rapid growth of startups operating in the social sector has spurred the recent development of a new type of accelerator – the social impact accelerator (SIA). Modeled closely after traditional accelerators (e.g., Y Combinator, Techstars, 500 startups), SIAs (e.g., Echoing Green, Startup Chile) are designed specifically to support early stage startups seeking to pioneer, validate, and scale new and unproven business models intended to generate meaningful social and/or environmental impact alongside positive financial returns (Lall et al., 2013).

As I identified in Chapter 2, research on SIAs is still nascent and, as a result, how they make cohort admission decisions is largely unknown. Due to the legitimacy ascribed to startups receiving accelerator support (Block et al., 2017), coupled with the importance of selection decisions on the efficacy of the acceleration process, Drover, Busenitz, et al., (2017) call for future research on the decision processes surrounding SIA cohort selection. In responding to this call, I acknowledge that most entrepreneurship research that has investigated selection decisions has relied on signaling theory and has focused on traditional investors, such as angels (e.g., Prasad, Bruton, & Vozikis, 2000), venture capitalists (e.g., Baum & Silverman, 2004; Busenitz, Fiet, & Moesel, 2005; Plummer et al., 2016), and banks (e.g., Eddleston, Ladge, Mitteness, & Balachandra, 2016), that tend to invest based purely on economic signals communicating a venture's ability to generate financial returns.

More recently, however, scholars have begun to examine the investment decisions of non-traditional investors, such as microlenders and crowdfunders, that tend to base their decisions on signals communicating a venture's potential for social impact (e.g., Greenberg & Mollick, 2017; Johnson, Stevenson, & Letwin, 2018; Lee & Huang, 2018; Moss, Renko, Block, & Meyskens, 2018). Taken together, these streams of reseach suggest that economic and social signals can each serve to legitimate a startup in the selection process. At the same time, because they have focused on either economic signals in masculine settings *or* social signals in feminine settings, it is difficult to surmise the extent to which these signals will matter in hybrid settings. By extending this line of inquiry into the context of SIAs, which emphasize financial success and social impact, I hope to understand whether and to what degree economic and social signals impact selection decisions when considered concurrently.

While I expect social startups seeking acceptance into SIAs to benefit from communicating both their economic and social credibility, I also acknowledge that in order for signals to be effective, they must be interpreted as intended, without bias (Park & Mezias, 2005). One form of bias that has received a great deal of attention in the entrepreneurial financing literature is gender (e.g., Brush, Carter, Gatewood, Greene, & Hart, 2001; Carter, Shaw, Lam, &

Wilson, 2007; Constantinidis, Cornet, & Asandei, 2006; Eddleston et al., 2016; Malmström, Johansson, & Wincent, 2017; Marlow & Patton, 2005). For example, scholars have found that external resource providers exhibit bias toward female entrepreneurs by charging them higher interest rates (e.g., Fraser, 2005; Wu & Chua, 2012), asking them to disclose more information before providing them with financing (e.g., Constantinidis et al., 2006; Murphy, Kickul, Barbosa, & Titus, 2007), providing them with smaller loans (Eddleston et al., 2016), and investing significantly less venture capital in their ventures (e.g., Kanze, Huang, Conley, & Higgins, 2018; Malmström et al., 2017) as compared to their male counterparts. As a result of this bias, female entrepreneurs have been found to be less likely than male entrepreneurs to utilize formal, external sources of financing during the startup phase (e.g., Coleman, 2000; Coleman & Robb, 2012), to use debt financing to finance ongoing operations (Sara & Peter, 1998), to be funded by angels (Becker-Blease & Sohl, 2007) and venture capitalists (P. G. Greene, Brush, Hart, & Saparito, 2001), and to issue an IPO (Nelson & Levesque, 2007).

As one possible explanation for these findings, Eddleston et al (2016, p. 490) argue, from the perspective of gender role congruity theory (GRCT) (Eagly & Karau, 2002), that "gender affects the degree to which women versus men benefit from positive signals." Based on a study of 201 small businesses, they find that banks invest less money in female entrepreneurs than male entrepreneurs even when they send the same signals about their ventures. While provocative, I suspect that Eddleston et al.'s (2016) results might be influenced, at least in part, by their empirical context. Because they focus on commercial entrepreneurs seeking bank loans, it is perhaps no surprise that masculine traits were found to dominate financing decisions. Given the prevalence of such an approach in studies focusing on entrepreneurship and gender, Jennings and Brush (2013, p. 686) question "whether male entrepreneurs operating in stereotypically feminine industries experience subtle or even overt forms of discrimination by resource providers." In response, a small but growing stream of research has begun to examine such contexts and highlight certain conditions that challenge the conventional understanding of gender bias by identifying situations in which women may not always be at a disadvantage. For example, recent research on entrepreneurship across the globe finds that female entrepreneurs are more likely to pursue social missions (e.g., Calic & Mosakowski, 2016; Hechavarria, Ingram, Justo, & Terjesen, 2012; Meyskens, Elaine Allen, & Brush, 2011) and, perhaps as a result, attract more crowdfunding than men (e.g., Greenberg & Mollick, 2017) due to the perception that they are more trustworthy (Johnson et al., 2018). Similarly, Lee and Huang (2018) find evidence to suggest that the female entrepreneurs can reduce the gender penalty by emphasizing the social and environmental welfare benefits of their ventures.

Notwithstanding the valuable contribution this stream of research makes by highlighting the possibility that women may not just be less disadvantaged than men but may actually be at an advantage compared to men, its focus on setting with only feminine attributes ignores the complementary role masculine factors might also play in the decision to support a social startup. My focus on SIAs responds more comprehensively to Jennings and Brush's (2013) call by examining whether or not the gender advantages men have been found to enjoy will hold in a context in which both masculine and feminine attributes ought to be relevant. In so doing, I see an opportunity to build upon research in this area by proposing that gender bias can have positive and negative effects on both men *and* women. Drawing on GRCT, I hypothesize that the gender effect is subject to the nature of the signal being sent by the entrepreneur, such that both men and women will experience advantages (and disadvantages) based on the congruity (or incongruity) of their gender with the signals they send about their startups.

Examining 2,324 startups that applied to a global network of 123 SIAs, I find that while both economic and social signals are positively associated with SIAs' selection decisions, gender stereotypes do seem to play an important role in how these signals are interpreted. Specifically, I find that the positive effects signals conveying economic and social credibility have on SIA selection decisions are magnified when they are congruent with gender roles ascribed to the lead entrepreneur. When these signals are incongruent with gender stereotypes, however, SIAs tend to either discount (for those with male founders) or, worse yet, penalize (for those with female founders) social startups in their selection decisions. The finding that, in the hybrid context of social entrepreneurship, where both agentic and communal traits are valued, female entrepreneurs are not necessarily at a disadvantage to male entrepreneurs, as most prior studies have concluded (e.g., Eddleston et al., 2016; Jennings & Brush, 2013; Malmström et al., 2017; Wilson, Carter, Tagg, Shaw, & Lam, 2007), but may actually obtain better outcomes from gender and signal congruity, supports a growing stream of research that has found similar silver lining effects (e.g., Greenberg & Mollick, 2017; Johnson et al., 2018; Lee & Huang, 2018) and suggests that signals may be best understood as a function of the broader context in which they are communicated. Simultaneously, despite these findings, this research shows that gender role congruity seems to favor men more than women and I provide a more nuanced understanding of the complex and uneven role gendered mental models may play in the signaling process.

Signaling theory, in essence, is based on the completeness of the information at hand; the more complete the information, the more informed decisions the receiver can make. However, in line with Drover, Wood, et al., (2017), our findings show that the additional information provided by gender actually triggers problems of signal interpretation and asymmetries grow wider particularly when that additional information seems incongruent with gender stereotypes.

Although SIAs tend to accept more female-led social startups on average, they nevertheless seem to still exhibit a stronger bias against them under incongruity. As a result, I suspect SIAs are missing out on supporting social startups with great potential for economic and social returns.

4.2 Social Impact Accelerators

By seeking to pursue a social mission through a business structure (Smith, Gonin, & Besharov, 2013), social startups are inherently saddled with two competing logics: a social welfare/Communal logic, which emphasizes improving social and/or environmental conditions, and a commercial/Darwinian logic, which stresses profit, efficiency, and operational effectiveness (Battilana & Dorado, 2010; Battilana, Lee, Walker, & Dorsey, 2012; Besharov & Smith, 2014; Fauchart & Gruber, 2011). Because each logic is supported by distinct goals, values, norms, and identities, their integration into one organizational entity (e.g., a Hybrid orientation; Fauchart and Gruber, 2011) often creates a "performing tension" as the organization strives to address the competing demands of its multiple, divergent stakeholders (Smith & Lewis, 2011). Specifically, given the broad range of a social startup's stakeholders (Grimes, 2010; Haigh & Hoffman, 2012; Hanleybrown, Kania, & Kramer, 2012), satisfying the demands of any one particular group has been found to be exceedingly difficult given that serving one (e.g., beneficiaries) might detract from the interests of another (e.g., external investors) (Tracey & Jarvis, 2007). For example, Jay's (2013) analysis of the Cambridge Energy Alliance shows how outcomes that support the organization's social mission simultaneously undermine its financial goals, and vice versa. Similarly, Tracey, Phillips, and Jarvis (2011) show how efforts to expand social impact at Aspire, a work integration organization, ultimately led to financial failure. These examples suggest that although social startups have been argued on theoretical grounds to be ideally suited to solving traditional market failures, increasing social welfare, and bringing about positive social change (e.g., Alvord, Brown, & Letts, 2004; Mair & Marti, 2006), empirical evidence of their ability to do so in a financially sustainable fashion is equivocal.

Given the challenges social startups face, they often seek the support of accelerators in order to help them develop and refine sustainable business models that can generate positive social/environmental and financial returns in their early years. As a relatively new form of startup assistance organization, startup accelerators are designed to help emerging ventures of all kinds define their ideas, build initial prototypes, identify promising customer segments, build relationships with external investors and industry experts, etc., all in a compressed time frame. Startup accelerators help meet these needs by providing a variety of means of support, including but not limited to networking, business training, mentoring, access to capital, and office space (Cohen, 2013). While most prominent accelerators (e.g., Y Combinator, Techstars, 500 Startups) are for-profit and target high-growth startups in the technology sector, a new type of accelerator, the SIA (e.g., Echoing Green, Startup Chile, etc.), has emerged in response to the growing number of startups seeking to serve a social purpose while earning a profit (e.g., European Investment Fund, 2017).

In addition to the legitimacy benefits startups receiving SIA support enjoy (Block et al., 2017), SIAs also provide tangible support for social startups. According to a 2012 report from Monitor-Deloitte and the Acumen Fund (Kohl et al., 2012), a “pioneer gap” separates the thousands of early-stage social entrepreneurs seeking to launch companies that can drive social change worldwide from the resources needed to build teams, the customer bases they intend to serve, and/or the financial capital necessary to achieve scale. Similar to the success traditional accelerators have played in jumpstarting high-growth technology ventures, Lall et al. (2013) argue that SIAs are a powerful force in bridging this pioneer gap and will, therefore, continue to proliferate in the coming years. As evidence, even traditional accelerators such as Y Combinator and Techstars have recently launched SIA initiatives to begin supporting social startups (Shieber, 2017).

Unfortunately, despite the important role SIAs have begun to play in the social sector, very little research has been conducted on them. As such, Drover, Busenitz, et al., (2017) argue that a better understanding of the decision processes surrounding SIA cohort selection can provide insight into the efficacy of the acceleration process. In responding to this call, I recognize that most entrepreneurship research focusing on selection decisions has relied on signaling theory (Rawhouser, Villanueva, & Newbert, 2017) and, therefore, use it as a foundation in the development of the conceptual model. At the same time, I note a complementary stream of research that highlight the under-specification of signaling theory as it does not account for the possibility that signals might not be received as intended (Alsos & Ljunggren, 2017; Eddleston et al., 2016; Lee and Huang, 2018). Thus, I layer gender role congruity theory (GRCT) onto signaling theory to explore how gender might impact signal interpretation.

4.3 Theory and Hypotheses Development

4.3.1 Signaling Theory

To illustrate how observable proxies or signals can be used to increase a decision-maker's ability to make informed choices, Spence (1973) theorizes about the difficulty employers have when trying to predict a job candidate's productive capability, an inherently unobservable quality. The "informational gap" between job candidates (who, at least presumably, know their ability) and employers (who cannot) introduces uncertainty into the hiring decision. To reduce this uncertainty, Spence (1973, p. 357-8) argues that job candidates can transmit information regarding their otherwise unobservable ability to employers in the form of a "signal," or an observable characteristic that is subject to manipulation[2]. According to Spence (1973), to the extent that employers believe one's education, for example, to be a reliable predictor of one's ability, job candidates who signal their educational credentials to employers can bridge the informational gap, thereby providing the basis for a more informed hiring decision.

Since the publication of Spence's (1973) article, the main tenets of signaling theory have been supported across a broad range of disciplines and contexts (e.g., Bird & Smith, 2005; Connelly et al., 2011). One area in particular that has been of interest to signaling theory scholars is entrepreneurial financing. Given that entrepreneurs tend to lack objective measures of their startups' credibility, such as a long history of exchange and/or a proven track record of performance (Stinchcombe, 1965), investors are often at an information deficit compared to entrepreneurs, which, in turn, introduces uncertainty into the investment decision. Accordingly, entrepreneurs that succeed in attracting financial capital have been found to be those that are able to bridge the informational gap by communicating observable signals of their startups' otherwise unobservable potential for success to a host of traditional investor groups, including angels (e.g., Becker-Blease & Sohl, 2015; Prasad et al., 2000), venture capitalists (e.g., Baum & Silverman, 2004; Busenitz et al., 2005; Plummer et al., 2016), and banks (e.g., Eddleston et al., 2016). Among the myriad signals of a new venture's quality that have been found to be predictive of financial investment are human capital (e.g., Baum & Silverman, 2004; Becker-Blease & Sohl, 2015; Beckman, Burton, & O'Reilly, 2007; Courtney, Dutta, & Li, 2017; Gompers, Kaplan, &

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[2] Note, Spence (1973) distinguishes signals from "indices," which he defines as attributes not generally thought to be alterable, such as gender and race.

Mukharlyamov, 2016; Higgins & Gulati, 2006; Hoenig & Henkel, 2015; Plummer et al., 2016; Wiklund & Shepherd, 2003), intellectual capital (e.g., Ahlers, Cumming, Günther, & Schweizer, 2015; Baum & Silverman, 2004; Block, De Vries, Schumann, & Sandner, 2014; Hoenig & Henkel, 2015; Haeussler, Harhoff, & Mueller, 2014; Hoenen, Kolympiris, Schoenmakers, & Kalaitzandonakes, 2014; Nadeau, 2010; Zhou, Sandner, Martinelli, & Block, 2016), social capital (e.g., Vismara, 2016), firm age and size (e.g., Baum, Calabrese, & Silverman, 2000; BarNir, Gallaugher, & Auger, 2003; Haines, Orser, & Riding, 1999; Eddleston et al., 2016), strategic partnerships (e.g., Plummer et al., 2016; Gulati & Higgins, 2003; Stuart, Hoang, & Hybels, 1999; Hoenig & Henkel, 2015), and the entrepreneur's willingness (e.g., Leland & Pyle, 1977; Vismara, 2016), commitment (e.g., Wilson et al., 2007), and personal investment (e.g., Busenitz et al., 2005).

Two general patterns can be identified from extant signaling literature that have bearing on the present study. From a theoretical standpoint, not all receivers seem to be attracted by the same signals in the same way. For example, patents have been found to be effective in attracting venture capitalists (e.g., Baum & Silverman, 2004; Nadeau, 2010), but not crowdfunders (e.g., Ahlers et al., 2015). Similarly, while prior investment by family and friends has been found to be a positive signal for business angels, it has been found to be a negative signal for venture capitalists (Conti, Thursby, & Rothaermel, 2013). The reason for such differences, according to (Drover, Wood, et al., 2017), is that signaling relies, in part, on the cognitive interpretations of those to whom the signal is directed and this largely depends on the receiver's subjective mental model.

From an empirical standpoint, the overwhelming majority of signaling research to date has focused on signals that reflect a firms' economic performance (Rawhouser et al., 2017), leaving issues specific to social startups at least partially unaddressed. Moreover, studies of how economic and social signals impact non-traditional investors' decisions show mixed results. For example, while some scholars have found that crowdfunders tend to respond more positively to social signals such as sustainability orientations (Calic and Mosakowski, 2016), social value orientations (Moss et al., 2018), and narratives that frame the social venture as an opportunity to help others (Allison, Davis, Short, & Webb, 2015), others have found crowdfunders to be more likely to invest in social ventures that signal autonomy, competitive aggressiveness, and risk-taking (e.g., economic signals) as opposed to conscientiousness, courage, empathy, and warmth (e.g., social signals) (Moss, Neubaum, & Meyskens, 2015). Interestingly, this preference for economic signals over social signals was also found in social venture capitalists (SVCs) and although SVCs do rely on social signals, such as a focus on a social mission and a demonstrated passion to enact social change, they seem to rely most heavily on traditional economic criteria (Miller & Wesley, 2010).

Taken together, these two patterns demonstrate that while many different types of organizations invest in startups, each perceives the signals sent by these ventures very differently. Given the hybrid context in which the startups that SIAs evaluate intend to operate (Lall et al., 2013; European Investment Fund, 2017), both social and economic signals *should* be important to SIA selection decisions. However, because SIAs represent a unique form of investor that has not previously been subjected to empirical analysis, coupled with the fact that prior research on other social investors is mixed, how SIAs actually perceive these signals remains an empirical question. Thus, I consider in the sections below how economic and social signals are likely to affect SIA selection decisions.

Prior equity investment as an economic signal. Equity financing represents the exchange of ownership for both capital and mentorship between entrepreneurs and investors. Given that equity investors are generally willing to risk their capital only if a startup has the potential to achieve a return of five to ten times the initial investment (Bussgang, 2014), entrepreneurs who successfully raise equity investment should be able to deliver a strong economic signal to other external parties of the significant upside potential of their startups in at least two ways. First, signaling that the venture has received an equity investment communicates to SIAs that the venture has already passed a rigorous financial analysis validating the viability and sustainability of its business model (Madill, Haines, & RIding, 2005; Stuart et al., 1999). Second, an equity investment signals that the venture will have access to the equity investor's superior resources, capabilities, and networks, all of which should enhance its prospects for scale and survival (Gulati & Gargiulo, 1999; Hsu, 2004; Stuart et al., 1999). In support of this logic, equity investment has been widely used and accepted in the empirical literature on signaling as a credible signal of a firm's economic potential (e.g., Gulati & Higgins, 2003; Higgins & Gulati, 2006; Pollock, Chen, Jackson, & Hambrick, 2010; Sanders & Boivie, 2004).

As noted above, the challenge facing SIAs is that while the upside economic potential of a social startup is a critical factor in the decision-making process (Lall et al., 2013; European Investment Fund, 2017), it does not manifest in a readily observable characteristic, a condition that results in an informational gap between the entrepreneur and the SIA. Given the high-quality information that an equity investment conveys about the financial health and potential of a social startup, entrepreneurs that send such a signal should be able to bridge this gap, thereby reducing uncertainty on the part of the SIA. As a result, I expect SIAs to interpret equity investment as a credible proxy for a social startup's economic prospects and, therefore, favor social startups that communicate having received such an investment when making selection decisions.

Hypothesis 1: SIAs are more likely to accept social startups that have received equity investment (an economic signal) than social startups that have not received equity investment.

Prior philanthropic investment as a social signal. A mission to serve others and/or bring about positive social change is a defining feature that distinguishes social startups from traditional startups (Dees, 1998). While social startups tend to be highly committed to their social missions early on in their history, they face conflicting demands that often arise from their commitment to simultaneously pursue both business and social motives in their ventures. This performing tension (Smith & Lewis, 2011) often leads these ventures to stray from that mission in pursuit of revenue generation over time. This process, known as mission-drift (Hockerts, 2006), "can create dissonance and interfere with critical processes of organizational identification on which much positive behavior depends" (Tracey & Phillips, 2007, p. 267) and may ultimately lead to venture failure (Foreman & Whetten, 2002). While mission-drift has, perhaps not surprisingly, been argued to be a major concern for social startups and those who support them (Hockerts, 2006), it is a difficult phenomenon to predict a priori due to its unobservable nature. Thus, SIAs who are interested in selecting startups that will generate positive social impact over the long-run (Lall et al., 2013; European Investment Fund, 2017) must often rely on signals of their commitment to a social mission. Following the logic supporting the receipt of equity investment as a signal of economic merits, I contend that receipt of philanthropic investment can convey a venture's social merits.

Philanthropy, which "conjoins a resolute sentiment of sympathetic identification of others, a thoughtful discernment of what needs to be done, and a strategic course of action aimed at meeting the needs of others" (Schervish, 1998, p. 600), is provided by a range of institutions from non-profit organizations, to foundations, to for-profit companies (Scarlata & Alemany, 2010). Such investments are generally driven by an institution's desire to achieve religious, social, and/or ecological motives that are either aligned with its investing ethos (Schäfer, 2004; Gray, Bebbington, & Collison, 2006) or intended to enhance its reputational capital by advancing the social causes that are important to its stakeholders (Brammer & Millington, 2005). In either case, philanthropic investors have a vested interest in the long-term ability of the ventures they support to realize their social missions. Accordingly, social startups that are able to communicate that they have received philanthropic investments should be able to deliver a strong signal to external parties of their ability to meaningfully impact society because philanthropy is not simply a passive, giving, or donating behavior, but rather a proactive, results-driven, value-creating, social return-seeking one (Dees & Jacobson, 2000; Porter & Kramer, 1999). In fact, many companies position philanthropy as a "strategic investment" to showcase their social intentions and social involvement (Porter & Kramer, 2002). Viewed in this light, it is clear that philanthropic investment can deliver on bringing about meaningful social change (Dees & Jacobson, 2000; Porter & Kramer, 1999) and the non-monetary resources, such as advice and links to other social enterprises provided by philanthropic investors can help the venture avoid mission drift (Dees and Jacobson, 2000; Hockerts, 2006).

As with economic signals, social signals provide SIAs with credible information that can reduce the uncertainty they face when evaluating a social startup's otherwise unobservable potential for social impact. Given the high quality information that a philanthropic investment conveys about a social startup's ability to deliver on its social mission without drifting away from it, entrepreneurs that send such a signal should be able to reduce the information asymmetry between the entrepreneur and the SIA and, in turn, the uncertainty surrounding the selection decision. As a result, I expect that SIAs will interpret philanthropic investment as a credible proxy for a social startup's commitment to a social mission and, therefore, favor social startups that have received such an investment when making selection decisions.

> *Hypothesis 2: SIAs are more likely to accept social startups that have received philanthropic investment (a social signal) than social startups that have not received philanthropic investment.*

4.3.2 Gender Role Congruity Theory

The previous two hypotheses suggest that economic and social signals should improve a social startup's likelihood of being selected by a SIA though the logic underpinning these hypotheses assumes that SIAs will make selection decisions without bias. However, as Alsos and Ljunggren (2017, p. 573) observe, "signals are valuable only in how they are interpreted by the receiver" and how an individual may interpret a signal has been shown to be a function of, among other factors, their cognitive biases (Drover, Wood, et al., 2017; Connelly et al., 2011). Thus, for social entrepreneurs seeking to signal the quality of their ventures to SIAs, it is critical that these signals be interpreted by the SIA in the way that the entrepreneur intended, without any bias.

While many potential cognitive biases that might influence signal interpretation exist, I turn my attention to the global issue of gender bias (Buss, 1989; Connell, 1987) because it is "fundamental in the structuring of society" (Jennings & Brush, 2013, p. 667). More specific to the present study, gender bias has been shown to be a significant factor in the unequal engagement levels in entrepreneurial activity for men and women across the globe (e.g., Kelley, Brush, Greene, & Litovsky, 2011). In particular, gender stereotypes have been found to have a negative effect on women's levels of self-efficacy (Sweida & Reichard, 2013), which has, in turn, been found to decrease entrepreneurial intentions (Gupta, Turban, Wasti, & Sikdar, 2009; Chen, Greene, & Crick, 1998; Chowdhury & Endres, 2005; Gatewood, Shaver, Powers, &

Gartner, 2002; Kourilsky & Walstad, 1998). Perhaps not surprisingly, women have been found to be less likely than men to become self-employed (Hughes, 1999; Lerner, Brush, & Hisrich, 1997; Robinson & Sexton, 1994).

Gender stereotypes have also been shown to have a negative impact on the perceptions external resource providers have towards women. For example, extant research suggests that gender biases often cause investors to view women as less competent than men and investors have been found to charge female entrepreneurs higher interest rates (e.g., Fraser, 2005; Wu & Chua, 2012), ask them to disclose more information before providing them with financing (e.g.,Constantinidis et al., 2006; Murphy et al., 2007), and invest significantly less venture capital into their ventures (e.g., Kanze et al., 2018; Malmström et al., 2017) as compared to male entrepreneurs. Given the prevalence of gender bias across a broad range of external evaluators of entrepreneurs, I suspect that it will unintentionally influence SIA evaluations of entrepreneurs and I, therefore, explore its effect on the efficacy of economic and social signals below.

Unlike sex, which reflects biological differences, gender is a socially constructed notion (Gupta et al., 2009), which manifests in "socially and culturally defined prescriptions and beliefs about the behavior and emotions of men and women" (Anselmi & Law, 1998, p. 195). In other words, perceptions of gender lead to stereotypes ascribed to each sex (Fiske & Taylor, 1991; Powell & Graves, 2003) and while women are commonly associated with low-status, subordinate roles, and communal traits such as compassion and honesty, men tend to be associated with high-status, leadership-oriented roles, and agentic/Darwinian traits such as determination and competitiveness placing women at a disadvantage in both employment and entrepreneurship opportunities (e.g., Eagly, 1987; Eagly & Diekman, 2005; Eagly & Wood, 2011; Eddleston et al., 2016; Gupta et al., 2009; Powell & Eddleston, 2013; Ridgeway, 2001, 2014; Ridgeway &

Correll, 2004; Alsos, Isaksen, & Ljunggre, 2006; Carter et al., 2007; Marlow & Patton, 2005; Orser, Riding, & Manley, 2006; Fauchart & Gruber, 2011). Blau and Kahn (2017) provide an excellent overview of the gender wage gap and highlight although the gender wage gap has declined considerable during 1980 to 2010, the gender pay gap declined much more slowly in the upper echelons of management.

Gender role congruity theory (GRCT) builds upon these global gender stereotypes by comparing beliefs about how men and women *should* behave (injunctive norms) with understandings of how men and women *actually* behave (descriptive norms) (Eagly & Karau, 2002). In essence, GRCT suggests that when injunctive and descriptive norms are congruent (e.g., when women assume subordinate roles or when men display agentic traits), individuals will be viewed more favorably than when injunctive and descriptive norms are incongruent (e.g., when women assume leadership roles or when men display communal traits). These gender stereotypes are so deeply embedded in the mental models of most individuals that GRCT research finds that both men and women endorse these gender stereotypes (e.g., Moss-Racusin, Phelan, & Rudman, 2010; Rudman, 1998; Rudman & Glick, 2001; Rudman & Phelan, 2008). As an example, research exploring perceptions of men and women in the workplace (a masculine domain) suggests that both men *and* women perceive female leaders/managers less favorably and as less competent than male leaders/managers (Eagly & Karau, 2002; Gupta et al., 2009; Inesi & Cable, 2015; Marlow, 2002; Northouse, 2018) due to the perceived incongruity between the attributes required for success in business (descriptive norms) and those ascribed to male and female gender roles (injunctive norms).

By serving as a shortcut in one's heuristic decision-making process (Heilman, 2001), gender stereotypes can easily influence the interpretation of a signal (Alsos & Ljunggren, 2017) and in recent research applying GRCT, Eddleston et al. (2016) find that female entrepreneurs receive smaller loan amounts than male entrepreneurs even when both groups send the same signals, an outcome they contend is due to the incongruity between the injunctive norms associated with the female gender role and gendered understandings of the practice of entrepreneurship. Similarly, Lee and Huang (2018) find evidence to suggest that while women-led ventures are perceived to be less viable than male-led ventures (given that leading a startup is inconsistent with the injunctive norms associated with the female gender role), women can actually reduce this gender disadvantage by signaling the social and environmental welfare benefits (attributes that are consistent with female-based injunctive norms) of their ventures. Recent research on entrepreneurship across the globe also finds that female entrepreneurs are more likely to pursue social missions (Calic& Mosakowski, 2016; Hechavarria et al., 2012; Meyskens et al., 2011) and attract more crowdfunding than men (Greenberg & Mollick, 2017) due to the perception that they are more trustworthy (Johnson et al., 2018). In other words, gender bias may not always manifest in prejudice against women, even when operating in a context with masculine attributes. Building upon this logic, while I expect gender bias to influence how SIAs interpret social entrepreneurs' signals and consistent with GRCT, I contend that both male *and* female entrepreneurs will experience better outcomes in SIA selection decisions when their gender and the signals they communicate about their social startups are congruent.

As noted above, SIAs, are interested in accepting startups that are likely to achieve financial success and growth while also delivering on a social mission over the long-run (Lall et al., 2013; European Investment Fund, 2017). For this reason, I hypothesized that signals that credibly convey the likelihood that a social startup will achieve these ends should factor prominently in an SIA's decision-making process. However, in accordance with GRCT, I suspect that how each of these signals is perceived by the SIA is likely to be impacted by the SIA decision-maker's mental model. As Alsos and Ljunggren (2017, p. 573) argue, the extent to which mental models are biased by gender stereotypes will "influence how investors, as signal receivers, interpret the signals sent by male and female entrepreneurs" and "because investors have been found to hold gendered ideas on the institutional model of a successful entrepreneur … one can assume that the receivers apply a gender filter when they assess the signalers and their signals". In other words, when an economic signal (reflective of a descriptive norm) is sent by an entrepreneur whose gender is congruent with the agentic traits assumed to result in business success (reflective of injunctive norms) – e.g., when sent by a man – the signal is likely to pass seamlessly through the receiver's gender filter and, thus, be interpreted as evidence of the venture's unobservable potential for financial success. Yet, when the same signal is sent by an entrepreneur whose gender is incongruent with these injunctive norms – e.g., when sent by a woman – it is likely to conflict with the receiver's gender filter and, in turn, be ascribed as less credible (Eagly, 1987). Following this logic, because women are typically ascribed a communal role (Eagly, 1987), their gender is generally perceived to be congruent with the message a philanthropic investment conveys; namely, a commitment to creating value for others and delivering positive social impact. Therefore, when such a signal is sent by a woman, it aligns with the receiver's gendered mental model and is, therefore, likely to factor favorably into the SIA's decision-making process.

In sum, rather than focusing solely on the inherent quality of a signal to make an informed decision, decision-makers often interpret signals through gendered filters. Accordingly, I hypothesize that the entrepreneurs' gender will influence the credibility of the signals they send such that when the global stereotypes associated with an entrepreneur's gender are congruent with the signal (that is, when an economic signal is sent by a male entrepreneur or when a social signal is sent by a female entrepreneur), the positive effect of the signal will be stronger than when those stereotypes are incongruent with the entrepreneur's gender (that is, when an economic signal is sent by a female entrepreneur or when a social signal is sent by a male entrepreneur). Figure 6 summarizes the conceptual model.

> *Hypothesis 3: Gender will moderate the relationship between signaling and SIA acceptance, such that SIAs are more (less) likely to accept social startups when they send signals that are congruent (incongruent) with the stereotypes associated with the lead entrepreneurs' gender. More specifically:*
>
> > *Hypothesis 3a: Social startups that send economic signals are more (less) likely to be accepted by SIAs when the lead entrepreneur is male (female).*
> >
> > *Hypothesis 3b: Social startups that send social signals are more (less) likely to be accepted by SIAs when the lead entrepreneur is female (male).*

4.4 Method

4.4.1 Data and Sample

The sample is drawn from the Global Accelerator Learning Initiative, an initiative of the Aspen Network of Development Entrepreneurs (ANDE), which focuses on promoting entrepreneurship in developing markets. From 2013 to 2017, ANDE surveyed entrepreneurs doing business in emerging markets across the globe that applied to a network of 203 SIAs. ANDE collected detailed data from these entrepreneurs at the time of the application to the SIAs and then subsequently on an annual basis in order to capture follow-up data (*ANDE Annual Report*, 2018). The data used in this study is from the initial survey only, which was administered during the application process. At the end of 2017, the database contained 13,495 observations; however, I restrict the sample in two ways. First, because 2016 was the first year data on acceptance/rejection to an SIA was documented, I limit the sample to responses from 2016 and 2017. Second, in order to avoid double-counting any startups that applied to SIAs in both 2016 and 2017, I limit the sample to startups that were founded in the same year they applied to an SIA (e.g., startups that were founded in 2016 and applied to SIAs in 2016 and startups that were founded in 2017 and applied to SIAs in 2017). After applying these restrictions, the sample consists of 2,324 unique startups that applied to 123 accelerators. To ensure that there were no startups in the sample that applied to more than one SIA, I checked for duplicates using the unique identification number assigned by ANDE to each startup and each SIA, and did not find any. Table 4 provides acceptance rates for the startups in the sample, based on the gender of the lead entrepreneur and the presence or absence of economic and social signals.

4.4.2 Measures

Dependent variable. The dependent variable in this chapter is whether or not the social startup was accepted by the SIA to which it applied. This variable is dichotomous and is coded one if the startup was accepted and coded zero if it was rejected.

Independent variables. The survey asked respondents to identify the sources from which their ventures had received any outside equity, with response options including angel investors, venture capitalists, other companies, government sources, or other. Given the legitimacy that an equity investment conveys about the viability of a startup's business model and its ability to generate lucrative financial returns, I operationalize an economic signal as a dichotomous variable, coded one for respondents that indicated having received an equity investment from any one of the sources listed above and coded zero for respondents that indicated not having received any equity investment. Similarly, the survey asked respondents to identify the sources from which their ventures had received philanthropic investment, with response options including other companies, government agencies, foundations or other nonprofits, fellowship programs, business plan competitions, or crowdfunding campaigns. Given legitimacy that a philanthropic investment conveys about a startup's commitment to and ability to deliver on a social mission, I operationalize a social signal as a dichotomous variable, coded one for respondents that indicated having received a philanthropic investment from any one of the sources listed above and coded zero for respondents that indicated not having received any philanthropic investment.

Moderator variable. The survey asked respondents to identify up to three of the startup's founders. According to a report summarizing the ANDE database (*ANDE Annual Report*, 2018, p.7), the first founder listed for each startup in the dataset is the lead entrepreneur. Using the gender data each respondent provided for this lead entrepreneur, I operationalize gender as a dichotomous variable, coded one for female-led startups and coded zero for male-led startups.

Control variables. To account for additional effects that might also impact selection decisions by SIAs, I control for the following. At the venture level, because different SIAs may have different preferences for the sectors in which they tend to select startups, I control for the primary sector in which the startup operates (Wiklund & Shepherd, 2003) by including a set of dummy variables for agriculture, health, and information technology, with "other" as the reference group. Given that different SIAs may also have different preferences in terms of the nature of the social impact they seek to support, I also control for the startups' impact objectives by including a set of dummy variables that identify the primary type of impact each startup sought to address: access to water, agriculture products, and community development, with "other" as the reference group. Additionally, because non-profit and for-profit organizations have intrinsic differences in structures, policies, and strategies (Hull & Lio, 2006; O'Connor &

Raber, 2001), I control for the startups' legal status by including dummy variables for both non-profit and for-profit, with "undecided/other" as the reference group. According to Baum and Locke (2004), when entrepreneurs make their visions explicit, they are more motivated to achieve them, which make them more attractive to SIAs. Thus, in order to account for different levels of motivation, I control for the startups' social motives as a dummy variable, coded as one if the startup explicitly stated it had social motive, and zero otherwise. Lastly, given evidence that a firm's intellectual capital is an important indicator of its innovative capabilities, which tends to attract investors (e.g., Baum et al., 2000; Nadeau, 2010), I control for each startup's intellectual capital by including a dummy variable, coded as one if the venture holds any patents, and zero otherwise.

At the entrepreneur-level, prior research has shown that owners' growth expectations are positively related to actual firm growth (Wiklund & Shepherd, 2003); thus, I control for the entrepreneurs' financial goals for their startups, coding respondents who sought to "cover costs and earn profits" as one and respondents who sought only "to cover costs" as zero. Given evidence that accelerator selection decisions are influenced by demographic factors in addition to gender, I also control for the age, prior management experience (Baum & Silverman, 2004); Beckman et al., 2007), and prior entrepreneurial experience (Burton, Sørensen, & Beckman, 2002; Hsu, 2007) of the lead entrepreneur. Assuming a curvilinear relationship between an entrepreneur's age and selection probability, I include first- and second- order terms of the lead entrepreneur's age (logged to eliminate skew). Additionally, I include dummy variables for both prior management experience and prior entrepreneurial experience, coding each as one if the lead entrepreneur had the requisite experience, and zero otherwise.

4.4.3 Model Specification

The data structure of the final sample is hierarchical with the social startups (level 1) nested the SIAs (level 2). In such cases, multilevel modeling is preferred over traditional statistical modeling because a multilevel modeling can (1) provide an unbiased systematic analysis of how covariates measured at various levels of a hierarchical structure affect the outcome variable and how the interactions among covariates measured at different levels affect the outcome variable; (2) correct for the biases in parameter estimates resulting from clustering; and (3) provide robust standard errors and, thus, robust confidence intervals and significance tests (Guo & Zhao, 2000). In order to account for the fact that the data does not include information on the decision-maker at each accelerator and that the dependent variable is dichotomous, I model the data with random effects (Greene, 2003) and apply a generalized linear mixed-effect model (GLMM) that can account for both random effects and selection probability. Using Stata 15, I utilize the *meprobit* command in order to fit the data with a mixed-effects probit model. The conditional distribution of the response variable, given the random effects noted above, is assumed to be Beronoulli, with success probability determined by the standard normal cumulative distribution function.

When interpreting the results of such a model, two issues are worth noting. First, as with other non-linear models, the coefficients reported from a mixed-effect probit regression do not indicate the actual magnitude of an effect. Second, the signs of and the *p*-values associated with the coefficients of any interaction terms reported from a mixed-effect probit regression may not necessarily reflect the actual direction or significance of the interaction (Hoetker, 2007). Thus, in order to determine the nature and significance of the main and interaction effects in the mixed effects probit regression, thereby facilitating the interpretation of the findings, I must calculate marginal probabilities for the coefficients of interest. To accomplish this, I use the *margins* command in Stata 15 in order to generate average marginal effects using the coefficients generated from the mixed effects probit regression. Conceptually, the marginal effect of a function is the slope (first derivative) of that function and in Stata 15, the *margins* command evaluates this derivative for each observation and reports the average of the marginal effects (StataCorp, 2017).

As a final point, because marginal probabilities are simply the average probabilities for each variable, further testing must be carried out to determine whether each marginal probability is significantly different from other marginal probabilities of interest. For this comparison, I use a contrast analysis. In Stata 15, the *contrast* command estimates factor variables and their interactions from the most recent mixed effects probit regression and allows us to determine whether any differences in the derived marginal probabilities across groups (e.g., selection probabilities for female-led startups with social signals vs. selection probabilities for female-led startups without social signals) are statistically significant (Casella & Berger, 2001).

4.5 Results

Table 5 reports Pearson correlations for all variables. This table suggests that the data is normally distributed and that multicollinearity is not likely to confound subsequent results.

4.5.1 Main effects

The results of the mixed effect probit analysis can be found in Table 6. I enter control variables in Model 1 and then add the independent variables in Model 2 to test hypotheses 1 and 2. The significance of the Wald χ^2 statistics indicates each model's fit, the significance of the likelihood ratio test statistics indicates that the mixed-effect probit model gives us more accurate estimations than the traditional probit model, and the decreases in both the Akaike and Schwarz's

Bayesian information criteria (AIC and BIC, respectively) from Model 1 to both Model 2 and Model 5 indicate improved model fit with the addition of the independent variables. These post-estimation tests suggest that the models are not mis-specified and fit the data well.

The results of Model 1 suggest that SIAs are, in general, more likely to accept social startups that operate in the health sector, possess intellectual capital (in the form of patents), are looking to earn a profit, and have middle-aged lead founders. Using coefficients from Model 1, I can also calculate the average probability that a social startup will be accepted into an SIA. Specifically, a marginal effect analysis of this data suggests that, holding all control variables constant at their means, a social startup has, on average, a 20.41% probability (p = 0.000) of being accepted by an SIA.[3] It must be noted that this statistic reflects the acceptance rate for social startups as a function of the specific vector of control variables included in the study and, thus, differs from the overall acceptance rate for the full sample shown in Table 7 which is a function of other factors not included in the analysis.

Model 2 tests the first two hypotheses. As these results show, the coefficient for economic signals is positive and significant, indicating that Hypothesis 1, which states that SIAs are more likely to accept social startups when they send economic signals ($\beta = 0.638$, p = 0.000), is supported. Similarly, the coefficient for social signals is positive and significant, indicating that Hypothesis 2, which states that SIAs are more likely to accept social startups when they send social signals ($\beta = 0.460$, p = 0.000), is also supported. These results hold in the full model as well (see Model 5).

[3] Analysis not reported herein, but available from the authors upon request.

4.5.2 Moderation effects

To test Hypotheses 3a and 3b, I include the interaction term for gender and economic signals in Model 3 and the interaction term for gender and social signals in Model 4. Models 3 and 4 show significant Wald χ^2 statistics, indicating model fit, and likelihood ratio test statistics, indicating accurate estimations of the data. In addition, the AIC and BIC decrease from Model 1 to Model 3 and from Model 1 to Model 4, suggesting improved model fit with the addition of the interaction variables. This evidence suggests that these models are not mis-specified and fit the data well. As with the main effect hypotheses, the results of the moderation hypotheses also hold in the full model (see Model 5).

As noted earlier, the direction and significance of an interaction term in a mixed-effects probit regression cannot be assessed by examining the sign of or *p*-value associated with its coefficient (Hoetker, 2007). In order to interpret the nature and significance of the effect of interaction terms in probit models, it is necessary to conduct a marginal effects analysis on the regression coefficients for these terms (Hoetker, 2007). Using the coefficients generated in Models 3 and 4, I conduct such an analysis, which yields the marginal probabilities for acceptance into SIAs by male- and female-led startups reported in Table 7.

To better visualize the moderation effect of gender on selection probability, I plot the marginal probabilities from Table 4 in Figure 7, where the reference line indicates the average selection probability (20.41%) as determined from Model 1. As the results in Table 4 and Figure 7 suggest, the probability of a male-led social startup with economic signals being selected in SIAs is 37.69%, compared to only 18.19% of female-led startups, and the selection probability of female-led social startups is 37.45% when they send social signals, compared to only 25.88% of male-led startups. While these results would appear to lend support to Hypothesis 3a, which states that SIAs will be less likely to accept social startups whose economic signals are sent by female (as opposed to male) entrepreneurs, and Hypothesis 3b, which states that SIAs are more likely to accept social startups whose social signals are sent by female (as opposed to male) entrepreneurs, it must be noted that while these marginal probabilities are statistically significant in the model, the *p*-values only indicate the marginal probability for each subgroup *compared to the entire applicant pool* (e.g., male-led startups with economic signals vs. all startups). What these marginal probabilities do not tell us is whether there is a significant difference *between specific subgroups* (e.g., male-led startups with economic signals vs. female-led startups with economic signals). To determine whether such statistical differences exist, I conduct a contrast analysis. Simply put, a contrast analysis is used to test the difference between two means to determine if each mean is statistically different from the other.

The results of the contrast analysis are presented in Table 5. These results suggest that the probability that an SIA will accept a social startup that sends an economic signal is 19.65% lower when the lead entrepreneur is female than when the lead entrepreneur is male. As this difference in acceptance rates is significant, I conclude support for Hypothesis 3a. These results also indicate that the probability that an SIA will accept a social startup that sends a social signal is 11.80% higher when the lead entrepreneur is female than when the lead entrepreneur is male. As this difference in acceptance rates is significant at the $p < 0.10$ level, I conclude weak support for Hypothesis 3b. Collectively, the results of all of the moderation tests suggest that SIAs are more likely to accept social startups when they send signals that are congruent with the stereotypes associated with the lead entrepreneurs' gender and less likely to accept social startups when they send signals that are incongruent with these stereotypes; thus, I conclude support for Hypothesis 3.

CHAPTER 5 DISCUSSION AND CONCLUSION

In this dissertation, I tried to systematically analyze the newcomer, the accelerator, of the entrepreneurial financing landscape, by reviewing relevant literature, redefine and reconceptualize the domain, conceptually identify their unique values along the venture creation pipeline and empirically examine the selection results of one special type of this institution. In this final Chapter, I will summarize main findings from prior chapters, highlight the contributions and also discuss the limitation and my future research.

5.1 Main Findings and Implications

5.1.1 Chapter 2

In Chapter 2, I systematically reviewed recent literature on accelerators, compared and contrast different definitions of accelerators, and extended the existing definition to redefine accelerators as "*Accelerator is a fixed term, cohort-based program aiming at enhancing startups' competency. Besides receiving mentorship and education, selected teams (in for-profit accelerators) or winning teams on a public pitch event or demo-day (in non-for-profit accelerators) will receive a small amount of seed capital."* In addition, I also applied the Entrepreneurial Value Creation Theory (Mishra & Zachary, 2014) to develop the "dual-role" model of accelerators to 1) delineate the boundary of accelerator from other similar institutions (e.g., incubators and venture investors, etc.) and 2) to illustrate the heterogeneity of accelerator programs. This Chapter contributes to current accelerator literature by providing a systematic review on its long-lasting definitional issue, and also provide a fundamental ground for other following chapters.

5.1.2 Chapter 3

Entrepreneurship ecosystems are seen as a regional economic development strategy (Spigel & Harrison, 2017). Scholars (Dabson, Rist, & Schweke, 1994; Harrison & Kanter, 1978; Lichtenstein et al., 2004; Lyons & Hamlin, 2001) have argued that the effects of this strategy are more sustainable and more cost-effective than the other major economic development strategies of business attraction and business retention/expansion. A strong and well-functioning entrepreneurship ecosystem should be led by entrepreneurs (Stam, 2015) who are actively learning from each other and sharing resources. To build a well-functioning entrepreneurship ecosystem, policy makers need to have a good understanding of how to facilitate high-growth ventures' entrepreneurial activities, rather than providing "economically inefficient blanket support for all types of new firm creation" (Spigel & Harrison, 2017, p.153). The key to being an "enterprise facilitator" is to find, nurture and develop entrepreneurs, encourage them to pursue their dreams, counsel them and connect them to other sources of assistance (Sirolli, 1999). However, as state earlier, Lichtenstein et al (2004) have pointed out that most enterprise development activities are fragmented and categorical in terms of the needs addressed, making entrepreneurs look at these offerings as a maze, with no entry point and no clear exit.

Chapter 3 makes two main contributions to both the current entrepreneurship ecosystem and accelerator literatures. First, I provide a holistic view of all three subsystems in the entrepreneurship ecosystem and illustrate how they interdependently function to develop entrepreneurs from lower-level to higher-level skills. This is important for both policy makers and entrepreneurs. The pipeline model helps policy makers to differentiate entrepreneurs and their ventures by referencing two variables (their skills and the life cycle stages of their businesses) and mapping the three subsystems to better assess and manage the ecosystem.

Entrepreneurs can use this pipeline map to help them to determine where they are now and to decide which type of accelerator they should approach for help.

Second, I contribute to the extant accelerator literature by clarifying different types of accelerators. Although this literature has reviewed the heterogeneity of accelerator programs and created typologies of them, few articles deeply discuss how they are different and the unique value that different types of accelerators might bring to their selected startups. In this chapter, I do not only specify where each type of accelerator fits into the pipeline model, but also point out the expected outcomes of participating in different types of accelerators. It is important for entrepreneurs to understand the type of accelerator that best fits their own unique objectives. In addition, this knowledge also provides pragmatic guidance for accelerator directors in designing and managing their accelerator programs more effectively.

5.1.3 Chapter 4

Drawing on signaling theory, I hypothesized that SIAs would view both economic and social signals positively when making selection decisions. The empirical results offer support for these main effect hypotheses and suggest that SIAs' reliance on these signals in their decision-making process is consistent with the dual logic used by similar organizations, such as SVCs (Miller & Wesley, 2010). Despite this generalized finding, I acknowledge prior research that suggests that in order for signals to be effective, they must be interpreted as intended, without bias (Park & Mezias, 2005). Thus, I contextualize the main effect hypotheses by leveraging GRCT in order to argue that the effect of these signals on acceptance is likely to be strongest when they are congruent with the stereotypes associated with the lead entrepreneurs' gender. The results also support these moderation hypotheses and suggest that economic signals are most likely to result in SIA selection when they are sent by male entrepreneurs and that social signals are most likely to result in SIA selection when they are sent by female entrepreneurs. In both cases of gender role congruity, the increase in selection probability (compared to startups that send no signals) is roughly equal (an increase of 19.13% for social startups with male entrepreneurs and an increase of 16.16% for social startups with female entrepreneurs) and significantly exceeds the acceptance rates for social startups sending incongruent signals.

This evidence, while not conclusive, suggests that under conditions of congruity, women who lead social startups may not just be *less disadvantaged* than men as prior research has suggested (e.g., Lee & Huang, 2018), but may actually be at an *advantage* compared to them. While this is good news for female entrepreneurs, the findings also reveal a striking difference in selection probability in cases where incongruity exists between the descriptive norms communicated by a signal and the injunctive norms associated with the sender's gender. Specifically, I find that while the acceptance rate for social startups with male entrepreneurs *increases* by 7.32% when they send social signals, the acceptance rate for social startups with female entrepreneurs *decreases* by 3.10% when they send economic signals. In other words, compared to social startups that send no signals whatsoever, those that send incongruent signals are slightly better off when the lead entrepreneur is male but are actually worse off when the lead entrepreneur is female. The unfortunate irony of these findings is that although SIAs appear to select social startups with female entrepreneurs at a higher rate than those with male entrepreneurs, they nevertheless still appear to be exhibiting gender bias toward women. I discuss the results and their implications for theory and practice below.

5.1.3.1 Implications for Theory

I believe this research reveals important insights about the interplay of signaling theory and GRCT by highlighting the subjective aspects of signal interpretation in the SIA selection process. According to Drover, Wood, et al., (2017, p. 2, emphasis added), "the vast majority of research on organizational signaling tends to investigate the ways in which a positive signal—*in isolation*—influences the decision-making of external constituents," and point out a flawed fundamental assumption of most prior organizational studies that apply signaling theory; namely, that signals will be interpreted rationally and unidirectionally by receivers. By highlighting the fact that decision-makers' interpretations of signals are often influenced by their own implicit, and often unconscious, biases, this research supports Spence's (2002) argument that, in addition to the signals they intentionally send, actors often unknowingly communicate a wide range of additional information that affects how they are judged and evaluated. While signaling theory has conventionally focused on minimizing uncertainty that results from incomplete information, the findings support Drover, Wood, et al., (2017) cognitive view of signaling theory and show that sometimes more information on the entrepreneur (e.g., gender) can also lead to unintentional misinterpretation.

I believe the results show that the congruity of the signals social entrepreneurs send with global gender stereotypes may be one such source of information that can bias signal interpretations and may help explain past findings on the disadvantages in which female entrepreneurs find themselves when seeking access to startup assistance. As noted above, there is a wealth of empirical evidence suggesting that external resource providers overwhelmingly exhibit bias toward female entrepreneurs (Fraser, 2005; Wu & Chua, 2012; Constantinidis et al., 2006; Murphy et al., 2007; Eddleston et al., 2016; Malmström et al., 2017) as compared to their male counterparts, causing female entrepreneurs to be less likely to have access to the same financing options than male entrepreneurs as they seek to create and grow their businesses

(Coleman, 2000; Coleman & Robb, 2012; Sara & Peter, 1998; Haines et al., 1999; Becker-Blease & Sohl, 2007; Greene et al., 2001; Nelson & Levesque, 2007).

In seeking to explain these findings, scholars have argued that the observed differences in access to entrepreneurial resources are not due to a lack of competence on the part of female entrepreneurs, but rather a *perception* of a lack of competence in eyes of external evaluators (Carter et al., 2007; Marlow & Patton, 2005; Murphy et al., 2007). In fact, research has shown these perceptions to be unfounded, as women entrepreneurs have been found to not only be better credit risks than male entrepreneurs (Watson & Robinson, 2003) but also out-survive male entrepreneurs in a wide variety of industrial and geographic contexts (Kalnins & Williams, 2014). While provocative, I contend that the implications of this literature are somewhat constrained due to the fact that most prior research in the area has focused on for-profit ventures seeking to gain access to financial resources. Given the masculine nature of these contexts, coupled with the gendered understanding of what it means to be an entrepreneur (Jennings & Brush, 2013), it is perhaps no surprise that investors have generally been found to show less interest in women entrepreneurs. Indeed, the finding that social startups sending economic signals are more likely to be accepted by SIAs when the lead entrepreneur is a man (as opposed to a woman) stands in support of this notion.

What has received less scholarly attention, however, are those contexts that are aligned with feminine gender roles, leading Jennings and Brush (2013, p.686) to question "whether male entrepreneurs operating in stereotypically feminine industries experience subtle or even overt forms of discrimination by resource providers." In response, a small but growing stream of research has begun to examine such contexts and highlight certain conditions that challenge the conventional understanding of gender bias and hint at situations in which women might not always experience worse outcomes than men. For example, in their study of sustainable businesses, Lee and Huang (2018) find that by emphasizing their ventures' social impact, female entrepreneurs can increase the overall perception of a venture's viability given that this framing is congruent with female gender stereotypes. Similarly, research on social entrepreneurship finds that women are more likely to pursue social missions than male entrepreneurs (Calic & Mosakowski, 2016; Hechavarria et al., 2012; Meyskens et al., 2011). Given this evidence, it is perhaps not surprising that women have been found to attract more crowdfunding than men (Greenberg & Mollick, 2017) due to the perception that they are more trustworthy (Johnson et al., 2018). Notwithstanding the contribution these studies makes to the understanding of gender bias in feminine contexts, it is important to note that because it focuses only on the ways in which gender stereotypes may benefit women, it ignores the inherent complexity of gender bias. It is this complexity that I have sought to unpack in this study. By integrating signaling theory with GRCT in the context of SIAs, I argue that whether or not female entrepreneurs will be at an advantage or disadvantage compared to male entrepreneurs is dependent upon the congruity between the dual signals they send and the stereotypes associated with their gender. By supporting this argument, this study extends prior work in the area by providing a more nuanced understanding of the role gendered mental models may play as external actors evaluate startups in hybrid settings. On the one hand, the finding that SIAs prefer male entrepreneurs who send masculine signals and female entrepreneurs who send feminine signals suggest that the effect of gender bias on signal interpretation is balanced as both male and female entrepreneurs achieve better outcomes from gender congruity. This is consistent with research on shifting standards and stereotypes. For example, Biernat and Kobrynowicz (1997) find evidence to suggest that judgements based on objective criteria (such as the economic and social signals) tend to lead to evaluations consistent with stereotypes, which they liken to a “flower blooming in spring.” On the other hand, the finding that acceptance rates increase above the base rate for male entrepreneurs when they send feminine signals but decrease below the base rate for female entrepreneurs when they send masculine signals suggest a much less optimistic view of gender bias as male entrepreneurs seem to achieve far better outcomes from gender incongruity than female entrepreneurs. By underscores the uneven effect of gender bias on signaling, this finding adds an important nuance to Biernat and Kobrynowicz's (1997) work. Specifically, while these authors do find evidence that a strong effort by low status groups (e.g., women) can lead to more favorable outcomes, I find that this effect, which they liken to a “flower blooming in winter,” occurs only in the case of high status groups (e.g., men). Given this evidence, the findings suggest that SIAs may have lower standards for male than female entrepreneurs despite their explicit interest in accepting more women.

In sum, by finding evidence that congruity between signals and gender stereotypes enables gender bias to work in an entrepreneur’s favor, this chapter both supports a central tent of GRCT and extends GRCT into a new context of inquiry, namely SIAs. More importantly, however, by finding evidence that incongruity leads to better outcomes for men more than women, my chapter is arguably the first GRCT study to suggest that all forms of gender role congruity are not necessarily created equal and that, where incongruity is present, double standards that disadvantage women compared to men may exist. This possibility is troublesome given recent research by Grimes, Gehman, and Cao (2018, p. 133) that suggests that women enter social entrepreneurship at higher rates than men as it provides “a means for those women owners to engage in identity work, authenticating values which are deemed central and distinctive.” While the values associated with social entrepreneurship are certainly congruent with feminine injunctive norms, whether they will have the opportunity to realize them by gaining acceptance into a SIA is unclear. Thus, I believe the conclusion that the gender bias toward women that has long been found to exist in masculine contexts is also present, albeit more subtly, in hybrid contexts to be an important contribution to GRCT and, therefore, encourage scholars to explore other hybrid contexts in order to assess the extent to which this phenomenon applies more broadly.

5.1.3.2 Implications for Practice

In addition to contributing to the theoretical understanding of the role gender stereotypes play in the signaling process, I believe the results may also have important implications for SIAs themselves given the light they shed on biases in their decision-making logic. According to ANDE's 2017 Impact Report (2017, p. 13), "in 2017, 65% of ANDE members who worked directly with [small and growing businesses] or entrepreneurs said they prioritize gender inclusion." Of those, 86% indicated that supporting women as entrepreneurs (as opposed to women as leaders, employees, clients, etc.) was "the top gender gap they aim to address." As evidence of this dedicated effort, the selection percentages from Table 4 show that the SIAs in the sample, which are affiliated with ANDE, accept female-led social startups at a substantially higher rate, on average, than male-led social startups (19% vs. 14%, respectively). While this overall preference for women is laudable, by analyzing the data more closely I see that, despite their explicit efforts to support women, the SIAs affiliated with ANDE are, perhaps implicitly, nevertheless exhibiting bias against them. As the results of the marginal effects and contrast analyses show, SIAs appear to only view women as credible when the signals they send communicate communal traits (e.g., such as compassion and honesty; Eagly, 1987; Eagly & Diekman, 2005; Eagly & Wood, 2011; Fauchart & Gruber, 2011) that are consistent with the injunctive norms associated with their gender. When female entrepreneurs send signals communicating agentic/Darwinian traits (e.g., determination and competitiveness; Eagly, 1987; Eagly & Diekman, 2005; Eagly and Wood, 2011; Fauchart & Gruber, 2011) that violate beliefs about how women ought to behave, SIAs appear to view them as less credible.

Randall Kempner, ANDE's Executive Director, alludes to this implicit bias in ANDE's 2017 Impact Report. In his opening letter, he proudly acknowledges the strides ANDE members have made toward eliminating the gender gap among small and growing businesses, writing "I'm encouraged by how ANDE members are working to close gaps in access to finance for women entrepreneurs. I've seen improvement since last year's revelation of an egregiously low percentage of investment vehicles focused on women. ANDE members are laying the groundwork for a renewed focus on gender inclusion" (ANDE 2017 Impact Report, 2017, p. 4). Despite this progress, he adds that "*we still have a long way to go until women entrepreneurs are taken as seriously as men*" (ANDE 2017 Impact Report, 2017, p. 4, italics added). Consistent with the findings, Kempner's admission suggests that while SIAs appear, at face value, to be favoring female entrepreneurs, they are actually only favoring those women that adhere to gender stereotypes (e.g., "flowers blooming in spring;" Biernat and Kobrynowicz (1997)). Those women that exhibit what are widely accepted to be masculine traits, however (e.g., "flowers blooming in winter;" Biernat and Kobrynowicz (1997)), are simply not taken "seriously" (to use Kempner's terminology) by SIAs.

Given that this gendered understanding of what it means to be a social entrepreneur appears to be rooted in perceptions (e.g., injunctive norms) versus reality (e.g., descriptive norms), I suspect that SIAs are missing out on supporting viable social startups led by women. This bias in decision-making not only hurts social entrepreneurs who are denied valuable startup assistance and the communities they aim to serve, but also negatively impacts the SIAs themselves as they benefit when the social startups they support succeed. Thus, whether to consciously support female entrepreneurs, to advance meaningful social causes, or to merely further their own self-interest, I advise SIAs to confront the unconscious, and perhaps unintended, biases reflected in their decision-making processes. As one potential solution, I suggest SIAs initiate a blind review process that removes gender information from decision-making, at least early on in the process. By eliminating identifying characteristics from applications, SIAs can ensure that all social entrepreneurs that communicate their startups' potential to generate financial returns and deliver on a social mission will, regardless of their gender, be taken seriously. On the other hand, SIAs may also want to consider gender-balanced selection panels or consider implementing a balanced portfolio approach that might better reflect their applicant pool. Quotas for women entrepreneurs, while possibly controversial, may also be an option for some SIAs to consider. The SIAs in this study have explicitly stated a focus on selecting women entrepreneurs and I urge them to be aware of subconscious bias that may creep in during their selection process. Implementing policies that may help counter this bias is a crucial next step.

5.2 Limitations and Future Research

Although I tried my best to make my dissertation as comprehensive and as systematic as possible, it still has several limitations that I hope I can eventually turn them into my future research opportunities. Firstly, although I integrated the pipeline model with extant entrepreneurship ecosystem literature to explain how different types of accelerators create different values to entrepreneurs, I was not able to collect sufficient data to empirically test my propositions of values brought by different types of accelerators. In my future research, I plan to keep my data collection process, and empirically test whether these propositions in my Chapter 3 will hold.

The second general limitation is that I only empirically examined the selection results of one specific type of accelerators (SIAs), but not other types of accelerators. The cognitive perspective of signaling theory suggests that the selection results do not only reflect objective signals but also signal receivers subjective signal interpretation process. Hence, given their innate differences embedded in initial organization designs (Pauwels et al., 2016), SIAs selection logics and results must be different from other accelerators because they should have different institutional logics, different organization goals, and different strategy sets. Considering the effects on applied startups of accelerators' selection decisions, it will be meaningful to keep collecting data from all different types of accelerators and comparing their selection logics and results.

Thirdly, in Chapter 4, I am also aware of some unavoidable limitations. To begin, given that startups are often founded by teams, it is likely that the gender of co-founders may also play a role in the selection process. For example, an all-male or all-female vs. a mixed-gender founding team may shape the decision-making process of SIAs in ways unaccounted for in this study. While I believe that the gender of the lead entrepreneur to be the most influential in the evaluation of a startup, especially where gender biases are concerned, I do not dismiss the possibility that some female-owned startups and some male-owned startups may experience different acceptance rates to the extent that they have co-founders of the opposite gender. Unfortunately, data on the gender composition of the founding teams in the sample is circumscribed given that respondents in the ANDE database were only able to provide information on up to three (at most) founders. Moreover, examining the dynamics of gender composition on teams introduces a host of theoretical issues that exceed the scope of the present study. In light of these issues, I advise scholars interested in this area of research to explore gender diversity on entrepreneurial teams in future studies.

In addition, while I believe that equity and philanthropic investment represent relevant, credible signals of a social startup's economic and social merit, I acknowledge that other signals may also be important to SIAs and influenced by gender. As noted above, I have chosen to focus on investment in general given research suggesting that the ability to acquire resources is an important signal to any potential investor and equity and philanthropic investment in particular given the information they provide SIAs about the ability for a startup to succeed in the hybrid context in which they intend to operate. Nevertheless, I suspect that other signals, including those captured in the vector of control variables (e.g., startup experience, managerial experience), may also communicate important information to SIAs and encourage scholars interested in this area of research to explore those effects in future studies.

On a related note, I also note that in operationalizing equity and philanthropic investment, my measurement model captures only the presence or absence of an economic or social signal and not the signals' strength. Thus, it is possible that the amount or source of investment (e.g., equity investment from a government agency vs. from a VC) and/or the number of investors (e.g., one philanthropic investor vs. multiple investors) may add information about a social startup's credibility. In light of prior signaling research suggesting that some sources of investment are perceived as more credible than others (Khoury et al., 2013; Pollock et al., 2010), I urge scholars interested in this area of research to consider examining how the nature of equity or philanthropic investment might affect SIA selection decisions. Relatedly, given that access to both equity and philanthropic investment is highly competitive, it is not surprising that only 291 of the 2,324 cases (or 12.52%) in the sample was able to send an economic and/or social signal. Coupled with the historically low acceptance rates by accelerators of all kinds (as noted by Ortmans (2016) and reinforced in Table 4), I advise readers to view the results in the context of the relatively small numbers of entrepreneurs in each category that were ultimately accepted by the SIAs in the sample.

Although the decision to focus on gender bias was made in light of evidence that it is one of the most prevalent biases across all cultures throughout the world (Buss, 1989; Connell, 1987) and should, therefore be generalizable to the context of interest, I acknowledge that many other sources of bias exist that may also influence the meaning and value of a given signal. Consequently, I propose that gender bias is, at best, a sufficient criterion for signal interpretation, but is not a necessary one. Accordingly, I advise scholars interested in this area of research to explore the role that other forms of bias may play in influencing a startup's access to resources.

Though I believe the global nature of the sample to be a strength of our study, I acknowledge there are likely nuances in how it informs the mental models of decision-makers across the 123 different SIAs in the sample due to idiosyncratic differences in micro- (e.g., their own gender), meso- (e.g., SIA preferences toward gender inclusion), and/or macro- (e.g., cultural norms) level characteristics. Given that the SIAs in the sample were distributed all across the world, I would have liked to control for such effects in order to account for any heterogeneity in decision-making. Unfortunately, the ANDE database does not include any identifying information on the decision-makers, the SIAs themselves, or countries in which they are located. As noted above, I attempted to account for any random effects SIA heterogeneity would have on selection by fitting the data with a mixed-effects probit model; however, to the extent that any such differences across SIAs have biased the results, I advise readers to accept the results guardedly.

The decision to focus on GRCT was due to my belief that SIAs (like most signal receivers) interpreted the signals sent by social startups through a gendered lens. Consistent with GRCT, I hypothesized that entrepreneurs who send signals that align with gender stereotypes will be at an advantage to those that violate them. Notwithstanding the empirical support for these hypotheses, it is possible that the positive effects of congruity or the negative effects of incongruity could be mitigated when both signals are present. While GRCT does not provide theoretical insight into such a relationship, it would nevertheless be interesting to test via a three-way interaction among gender, economic signals, and social signals. Unfortunately, as Table 4 shows, only 13 startups in the sample sent both signals, and among that subset no women were accepted. As such testing for a three-way interaction is not possible. However, as these numbers increase over time as more data is collected, I encourage scholars to explore what, for now, remains an empirical question. In the interim, I believe research employing experimental techniques, whereby researchers can manipulate the signal type based on the gender of participant, may extend the findings of the present study.

Finally, as SIAs are a relatively new phenomenon in the broader social entrepreneurship area, this is the first study to my knowledge to explore SIA decision-making. While I believe that my study provides valuable insight into the types of decisions SIAs make and offers a compelling explanation for why they make them, the cross-sectional approach I adopted due to the limited number of years (two) of data that were available, does not allow us to prove a causal effect. Thus, I encourage future scholars to investigate the selection process at the cognitive level, through longitudinal, experimental, and/or qualitative research designs, in order to confirm whether and how SIA decision-makers interpret signals through gendered mental models. Given the important role organizations that startup assistance organizations using a dual logic (e.g., SIAs, SVCs, microfinanciers, socially-responsible investors) are having in the social entrepreneurship ecosystem, I believe that a deeper understanding of how they interpret signals is essential.

APPENDIX

Table 1 Literature Review of Accelerator Studies

No	Author and Year	Types of Accelerator	Research Question	Research Method	Key Findings
1	Radojevich-Kelley, N., & Hoffman, D. L. (2012).	Seed accelerator	What do accelerators do and what are their results?	Case study	1) Accelerator companies use unique selection criteria and have higher success rates for their graduates; 2) Mentorship driven programs increase the overall success rates of start-ups by providing entrepreneurs with access to angel investors and venture capitalists which tend to increase success rates
2	Winston Smith, S., Hannigan, T. J., & Gasiorowski, L. L. (2013).	General*	how do accelerator-driven mechanism interact with crowdfunding-driven mechanism to launch new companies	Quantitative Study	Accelerator-backed startups: 1) receive the first round of follow-up financing significantly sooner; are more likely to be either acquired or to fail; 2) are founded by entrepreneurs from a relatively elite set of universities; and 3) exhibit substantially greater founder mobility amongst other accelerator-backed startups.
3	Cohen, S., & Hochberg, Y. V. (2014).	General	What is the "accelerator" phenomenon?	Conceptual Study	Described: 1) value of these programs; 2) Definition of accelerator programs; 3) the differences between accelerators, incubators, angel investors and co-working environments; and 4) the importance of the various aspects of these programs to the ultimate success of their graduates, the local entrepreneurship ecosystems

4	Fehder, D. C., & Hochberg, Y. V. (2014).	General	What impacts that accelerators bring to local region	Quantitative Study	The arrival of an accelerator associated with an annual increase of 104% in the number of seed and early stage VC deals in the MSA, an increase of 1830% in the total $$ amount of seed and early stage funding provided in the region, and a 97% increase in the number of distinct investors investing in the region.
5	Hallen, B. L., Bingham, C. B., & Cohen, S. (2014, January).	Seed accelerator	Whether or not the "acceleration" effect exists?	Quantitative Study	1) Acceleration effects are difficult to be achieved by all accelerators; 2) accelerators are complements to (and not substitute for) more experienced and connected founders
6	Wise, S., & Valliere, D. (2014).	seed accelerator, University accelerator	How do accelerators' managers' experiences influence their performance	Quantitative Study	The direct startup experience of accelerator managers matters more than their connectedness to the ecosystem
7	Regmi, K., Ahmed, S. A., & Quinn, M. (2015).	General	Assess the effectiveness of accelerators	Descriptive	1) The number of accelerators in the US is in the rise, while the growth has slowed down significantly after a very high rise in 2012. 2) Startups that graduated from accelerator programs have approximately 23% higher survival rate than other new businesses.
8	Weiblen & Chesbrough, 2015	Corporate Accelerators	How large corporations from the tech industry have begun to tap into entrepreneurial innovation from startups.	Qualitative Study	Corporate accelerator is one mechanism that corporate could use to engage with startups that balance speed and agility against control and strategic direction, and to bridge the gap between themselves and the startup world

9	Hochberg, Y. V. (2016).	General	What is the "accelerator" model and their effects on regional environment	Conceptual Study	Summarize prior conceptual studies on accelerators by describing the phenomenon, emphasizing its definitions, differentiating it from incubators, business angels, coworking spaces and venture capitalists, and identify current evolving trends
10	Kanbach & Stubner, 2016	Corporate Accelerators	What is the "corporate accelerator"? How do they function and why they exist?	Qualitative Study	Identify four different types of corporate accelerators: 1) listening post; 2) Value chain investor; 3) Test laboratory; 4) Unicorn hunter. Propose that they are different from each other in terms of their objectives and configurations.
11	Kohler, 2016	Corporate Accelerators	How to design corporate accelerators in a more effective way?	Quantitative Study	To leverage startups' innovation and to make corporate accelerators an effective part of a firm's overall innovation strategy, managers need to systematically and thoughtfully consider the design dimensions of proposition, process, people and place
12	Pauwels, C., Clarysse, B., Wright, M., & Van Hove, J. (2016).	General	What is the "accelerator" model and its taxonomy based on different design logics?	Qualitative Study	Identify 1) **three** design themes (categories) of accelerator model: "*Ecosystem builder*", "Deal-flow maker", "Welfare stimulator", and 2) **five** design elements--program packages; strategic focus; selection process; funding structure; alumni relations
13	Plummer et al, 2016	General	How do accelerators magnify other "signals" of young ventures when they pursue financing opportunities	Quantitative Study	A startup's characteristics and actions are signals that remain relatively unnoticed unless a startup combines them with a third-party affiliation that enhances the signal's value, thus increasing the likelihood of receiving external capital

14	Battistella, Toni & Pessot, 2017	General	How can start-ups benefit from participation in an accelerator program from an open innovation perspective?	Qualitative Study	Dyadic co-creation with accelerator network partners and crowdsourcing are revealed to be effective practices provided by accelerators that benefit startups most. But participating in accelerators cannot substitute the founding team intrinsic characteristics
15	Leatherbee & Gonzalez-Uribe, 2017 (AoM presentation)	Ecosystem accelerator (social accelerator; impact accelerator)	Do business accelerators affect new venture performance?	Quantitative Study	Entrepreneurship schooling bundled with basic services can significantly increase new venture performance, but no support for causal effects of basic services by them own
16	Goswami, K., Mitchell, J. R. and Bhagavatula, S. (2018)	General	What intermediary role do accelerators play in developing regional entrepreneurship ecosystems?	Qualitative Study	Accelerator play a key intermediary role in linking founders to their regional entrepreneurship ecosystems; four accelerator expertise: connection, development, coordination, and selection
17	Cohen, Bingham & Hallen, 2018	Private Accelerator	Why some accelerators are more effective than others?	Quantitative Study	Accelerators that provide concentrated consultation, foster comparisons, and require activities can help participating entrepreneurs overcome their bounded rationality

*When authors did not specify which type of accelerators they studied, either they use “accelerator” as a broad item containing all types, or they simply refer to the most common type of accelerators: standalone seed accelerator

Table 2. Entrepreneurs at Different Skill Levels And Commensurate Service Providers

	Tech	Managerial	Entrepreneurial	Personal	Service Providers
Majors	Outstanding	Outstanding	Outstanding	Outstanding	Venture capitalists, Professional consulting practices, investment bankers, etc.
AAA	High	High	High	High	Angel investors, emerging business consulting practices, university tech transfer offices
AA	High	Medium	Medium	Medium	Manufacturing extension programs, small business development centers, small specialized venture funds, high-technology incubation programs, etc.
A	High and/or medium	Low	Low	Low	Micro-enterprise programs, small business development centers, business incubation programs, etc.
Rookie	Low and/or no	Low and/or no	Low and/or no	Low and/or no	Micro-enterprise programs, youth entrepreneurship programs, etc.

Source: Adapted from Lichtenstein & Lyons (2006)

Table 3. Stages of New Ventures

Stages	Descriptions
Stage 0	This phase begins with either an interest or desire on the part of an entrepreneur to start a business, or an idea for a business, and ends with the emergence or birth of an organization with an economic offering (e.g., a produce or a service) ready to be sold to a potential client and to generate revenue.
Stage 1	This phase begins when the business is launched (with a product or service ready for sale) and ends when the business has reached breakeven from sales. The business has passed the first preliminary test of survival—its offering has demonstrated some interest by a small set of customers, although acceptance by the “market” has not yet been demonstrated. Profitability has not yet been achieved, and the venture’s continued viability (i.e., its ability to maintain a separate existence) is not assured. However, the business exhibits potential.
Stage 2	This phase begins with breakeven from sales and if successful, ends with the establishment of a sustainable business—with either healthy or marginal profits. The latter pays a living wage (i.e., a “mom-and-pop” operation), whereas the former would be positioned to grow further. This level of economic viability or measure of stability has been achieved by securing and satisfying a critical mass of customers and producing sufficient cash flow to at least repair and replace the capital assets necessary to continue the business as those assets wear out. This assures the survival of the business as long as market conditions remain the same.

Source: Lichtenstein & Lyons (2006)

Table 4. Overview of The Sample

		All startups		**Male-led startups**		**Female-led startups**	
Full sample	Accepted	367	16%	223	14%	123	19%
	Rejected	1,957	84%	1,379	86%	517	81%
Neither signal	Accepted	296	15%	174	13%	101	18%
	Rejected	1,737	85%	1,216	87%	461	82%
Only economic signal	Accepted	24	26%	21	27%	3	18%
	Rejected	70	74%	56	73%	14	82%
Only social signal	Accepted	44	24%	25	20%	19	32%
	Rejected	140	76%	99	80%	40	68%
Both signals	Accepted	3	23%	3	27%	0	0%
	Rejected	10	77%	8	73%	2	100%

Table 5 Descriptive Statistics and Correlation Table

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1. Selected											
2. Survey year (2017)	0.104***										
3. Sector (agriculture)	0.013	(0.047)*									
4. Sector (IT)	(0.048)	(0.024)	(0.133)								
5. Sector (health)	0.062**	(0.021)	(0.110)	(0.141)							
6. Sector (other)	(0.014)	(0.060)**	(0.446)	(0.570)***	(0.472)***						
7. Impact objective (water)	0.016	0.043	(0.014)	(0.047)	(0.028)	0.062**					
8. Impact objective (agricultural productivity)	0.027	(0.047)*	0.686***	(0.109)***	(0.071)***	(0.295)***	(0.012)				
9. Impact objective (community development)	(0.036)	(0.029)	(0.013)	(0.017)	(0.079)***	0.071***	(0.019)	(0.032)			
10. Impact objective (others)	(0.021)	(0.007)	(0.061)**	(0.021)	(0.020)	(0.066)***	(0.027)	(0.065)***	(0.023)		
11. Intellectual capital	0.004	0.020	0.068***	(0.054)**	(0.013)	0.006	0.089***	0.064**	(0.004)	0.011	
12. Profit goal	0.063**	(0.015)	0.046*	(0.027)	(0.020)	0.002	0.003	0.061**	(0.078)***	0.011	0.012
13. Legal status (non-profit)	(0.005)	0.053**	(0.026)	(0.061)**	0.027	0.044*	(0.013)	(0.016)	0.121***	(0.004)	(0.008)
14. Legal status (for-profit)	(0.001)	(0.076)***	0.031	0.103***	(0.061)**	(0.056)**	(0.029)	0.016	(0.117)***	(0.002)	0.036
15. Legal status (other)	0.004	0.052**	(0.018)	(0.077)***	0.053**	0.034	0.043*	(0.007)	0.051**	0.005	(0.036)
16. Explicit social motive	(0.034)	0.108***	0.066**	(0.111)***	0.029	0.013	0.051*	0.121***	0.166***	0.146***	0.050*
17. Age	(0.057)**	0.007	0.023	(0.016)	0.014	(0.011)	(0.008)	0.013	0.005	0.019	0.061**
18. Age (squared)	(0.058)**	0.015	0.022	(0.014)	0.020	(0.016)	(0.010)	0.011	(0.003)	0.018	0.071***
19. Prior management experience	(0.012)	0.006	0.048*	(0.034)	0.043*	(0.032)	0.054**	0.024	0.016	0.042*	0.107***
20. Prior entrepreneurial experience	(0.028)	0.009	0.050*	(0.048)*	(0.012)	0.013	0.048*	0.059**	0.044*	0.044*	0.096***
21. Gender (female)	0.066**	0.033	(0.014)	(0.101)***	0.052**	0.051**	(0.027)	(0.025)	0.061**	(0.018)	(0.052)**
22. Economic signals	0.057**	(0.043)*	(0.028)	0.012	0.060**	(0.030)	(0.010)	(0.038)	0.026	0.019	0.065***
23.Social signals	0.067**	0.027	0.013	(0.055)**	0.049*	0.001	(0.008)	0.035	0.039*	0.029	0.089***
Observations	2324	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627
Mean	0.158	0.432	0.094	0.145	0.104	0.657	0.129	0.088	0.148	0.102	0.056
Standard deviation	0.365	0.495	0.292	0.352	0.305	0.475	0.113	0.284	0.355	0.302	0.231

Variable	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
12. Profit goal												
13. Legal status (non-profit)	(0.412)***											
14. Legal status (for-profit)	0.277***	(0.533)***										
15. Legal status (other)	(0.027)	(0.087)	(0.797)***									
16. Explicit social motive	0.004	0.028	(0.057)**	0.047*								
17. Age	(0.019)	0.022	(0.037)	0.028	(0.007)							
18. Age (squared)	(0.016)	0.022	(0.038)	0.028	(0.002)	0.956***						
19. Prior management experience	0.008	0.019	(0.029)	0.021	0.051*	0.101***	0.117					
20. Prior entrepreneurial experience	0.043*	(0.019)	0.016	(0.005)	0.024	0.105***	0.123***	0.481***				
21. Gender (female)	(0.013)	0.055**	(0.091)***	0.068***	0.051*	(0.001)	(0.011)	(0.069)***	(0.107)***			
22. Economic signals	0.038	(0.042)*	0.064**	(0.045)*	(0.017)	0.010	0.006	0.098***	0.111***	(0.048)*		
23.Social signals	(0.025)	0.092***	(0.065)***	0.011	0.070***	(0.038)	(0.049)*	0.070***	0.102***	0.017	0.039*	
Observation	2,197	2627	2627	2627	2197	2,578	2,578	2,627	2,627	2544	2627	2627
Mean	0.905	0.055	0.830	0.115	0.860	3.447	11.966	0.218	0.441	0.279	0.041	0.078
Standard Deviation	0.293	0.228	0.376	0.319	0.347	0.294	1.768	0.413	0.497	0.448	0.199	0.268

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 6 Mixed-effect Probit Analysis: Selection Probability

	Model 1	Model 2	Model 3	Model 4	Model 5
Survey year (2017)	0.164	0.189	0.189	0.155	0.180
Sector (agriculture)	0.106	0.125	0.107	0.131	0.133
Sector (health)	0.367***	0.327*	0.355**	0.352**	0.340***
Sector (information technology)	(0.225)	(0.223)	(0.229)	(0.220)	(0.223)
Impact objective (water)	0.109	0.105	0.109	0.144	0.144
Impact objective (agriculture productivity)	0.157	0.172	0.180	0.142	0.165
Impact objective (community development)	(0.145)	(0.158)	(0.163)	(0.138)	(0.158)
Intellectual capital	0.271†	0.187	0.248	0.239	0.213
Profit goal	0.423*	0.408*	0.418*	0.417*	0.411*
Legal status (non-profit)	0.141	0.129	0.136	0.111	0.107
Legal status (for-profit)	0.142	0.127	0.109	0.147	0.113
Explicit social motive	(0.189)	(0.198)	(0.173)	(0.218)†	(0.203)
Age	7.470†	7.178†	7.213†	7.464†	7.218†
Age (squared)	(1.113)*	(1.061)†	(1.073)†	(1.104)†	(1.065)†
Prior management experience	0.098	0.070	0.077	0.095	0.074
Prior entrepreneurial experience	(0.085)	(0.105)	(0.099)	(0.099)	(0.116)
Gender (female)	0.135	0.133	0.192*	0.069	0.126
Economic signals		0.638***	0.799***		0.815***
Social signals		0.460***		0.315*	0.331*
Gender (female) * Economic signals			(0.992)*		(0.989)*
Gender (female) * Social signals				0.372	0.367
Log Likelihood	(737.966)	(724.596)	(728.422)	(730.870)	(721.135)
Wald χ^2	40.130***	65.43***	58.22***	53.73***	71.71***
Observations	2025	2025	2025	2025	2025
Number of accelerators	123	123	123	123	123
Likelihood ratio test	189.880***	199.080***	195.900***	194.720***	201.42***
AIC	1515.932	1493.193	1500.845	1505.746	1488.27
BIC	1628.198	1616.686	1624.338	1629.239	1617.377

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 7 Marginal Effect Analysis: Selection Probability by Gender and Signal

		Economic signal	Social signal
Male-led startups	Without signal	0.182^{***}	0.189^{***}
	With signal	0.377^{***}	0.259^{***}
Female-led startups	Without signal	0.222^{***}	0.204^{***}
	With signal	0.182^{*}	0.375^{***}

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 8 Contrast analysis: Comparison of Selection Probabilities by Gender and Signal

	With economic signals	With social signals
Female-led (vs. male-led) startups	$-19.65\%^{*}$	$11.80\%^{\dagger}$

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note: Sample sizes for all categories provided in Table 4.

Figure 1 Conceptual Model of Accelerators' Added Value to The Entrepreneurship Process

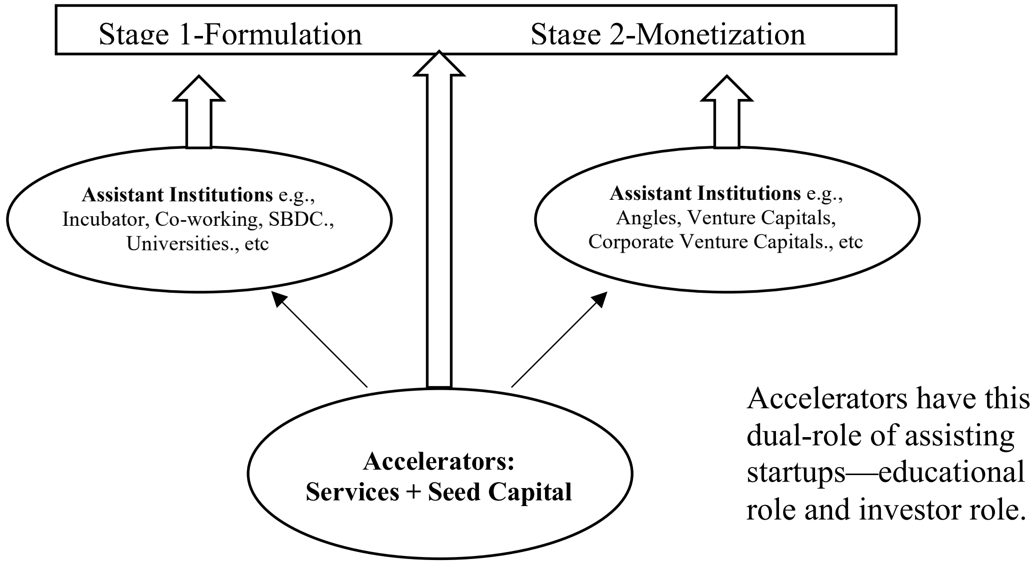


Figure 2 Accelerators' Preferences on "Dual-role"

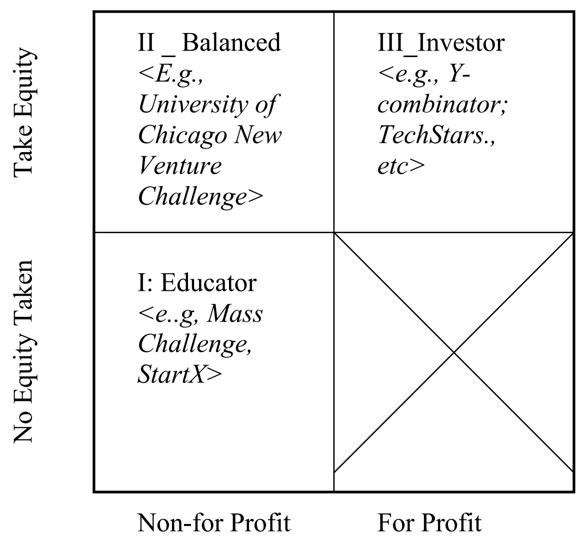


Figure 3 The Accelerator (Dual-Role) Definition Spectrum

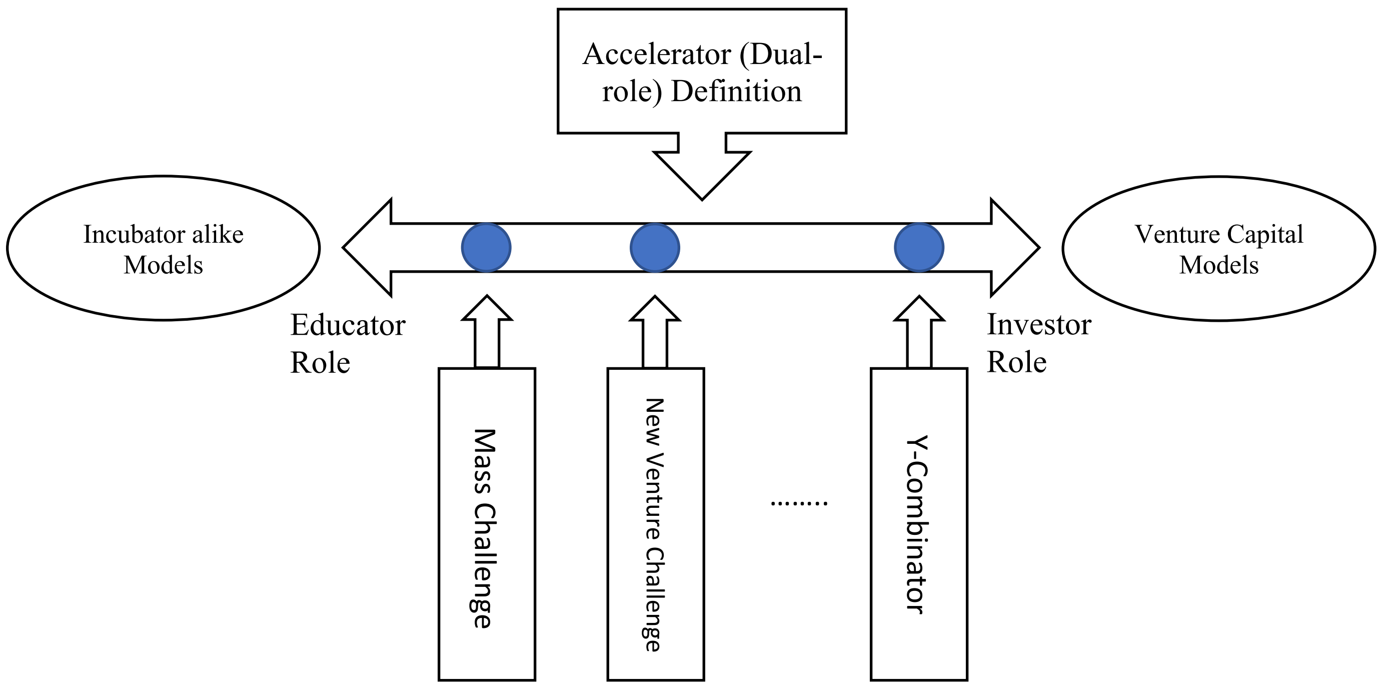


Figure 4 Entrepreneurship Ecosystem Pipeline

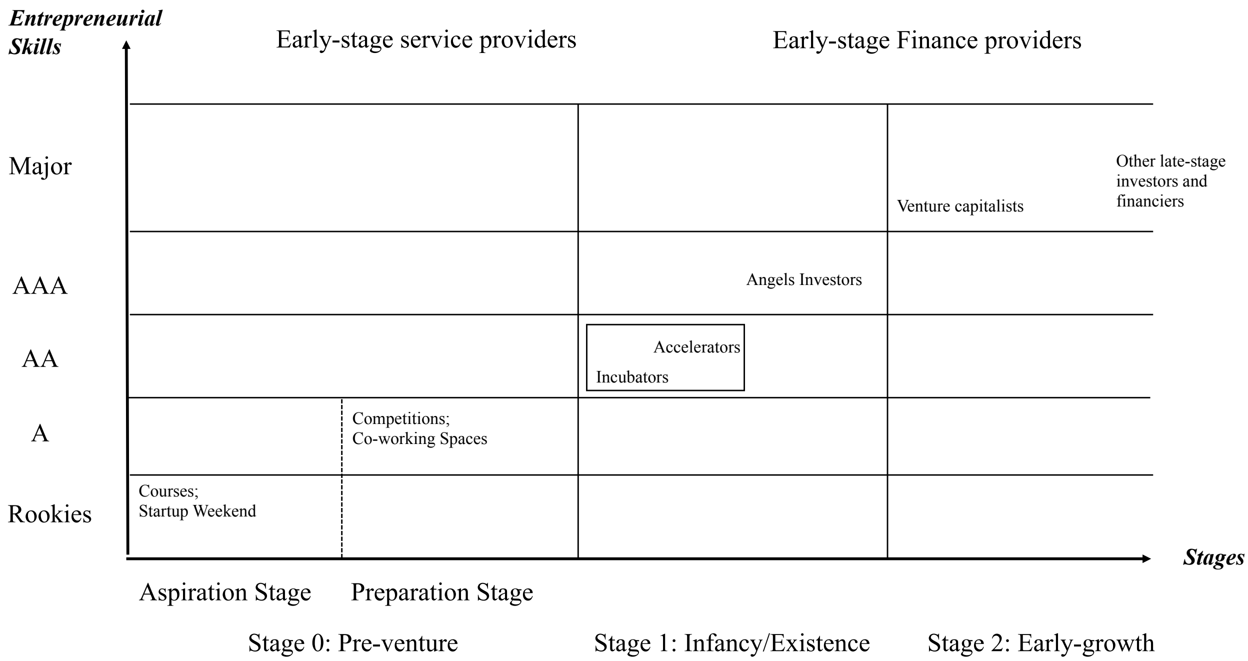


Figure 5 Expected Outcomes of Different Types of Accelerators

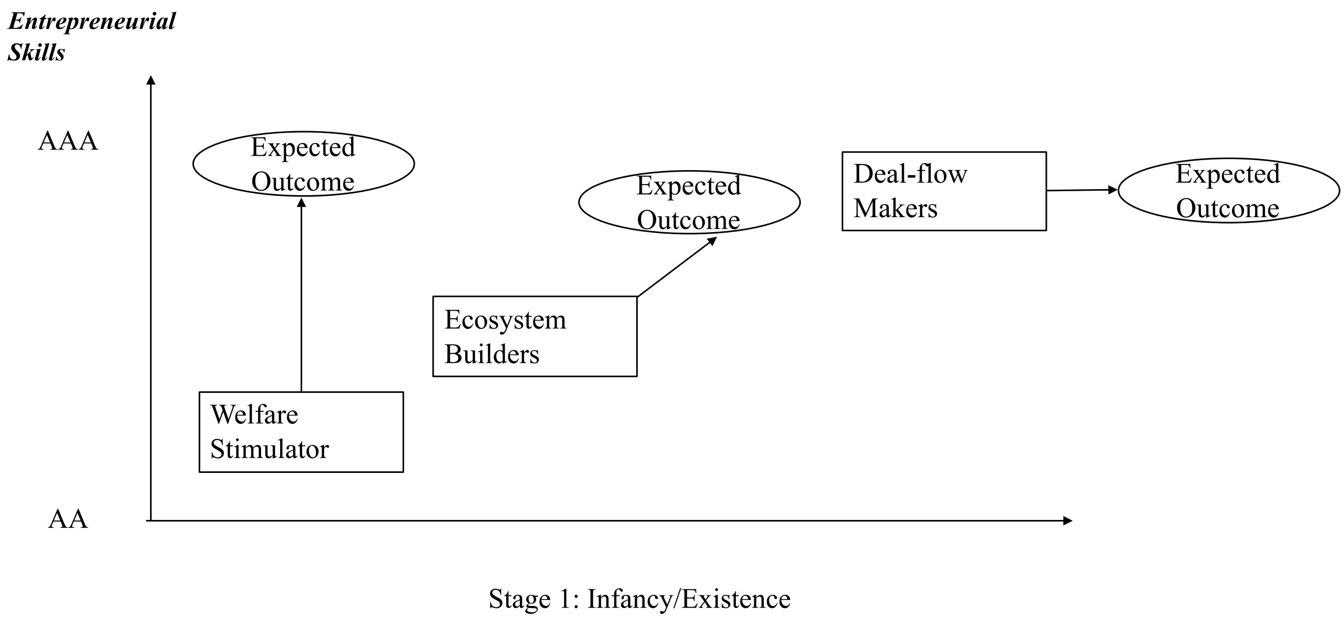


Figure 6 The Conceptual Model of SIA Selection

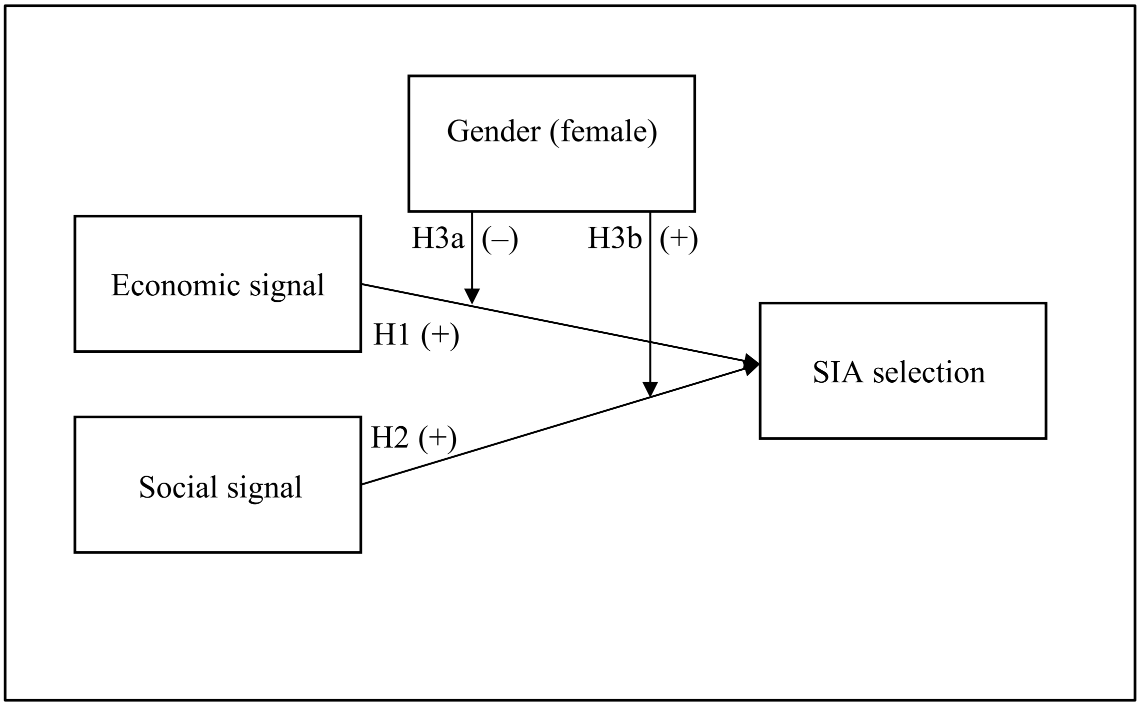
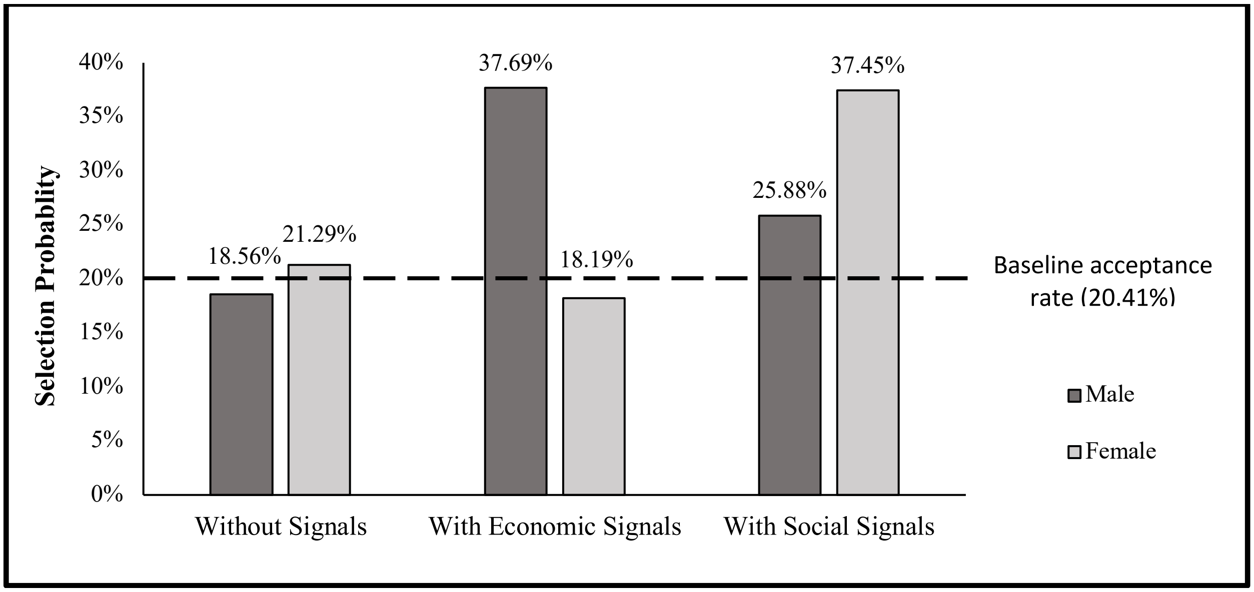


Figure 7 Selection Probability by Gender and Signal



Note: Sample sizes for each category provided in Table 4.

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