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Now and Later? Mentorship, Investor Ties and Performance in Seed-Accelerators

Jorge Mejia
University of Maryland
Robert H. Smith School of Business
jmejia@rhsmith.umd.edu

Anand Gopal
University of Maryland
Operations and Information Technologies
agopal@rhsmith.umd.edu

Abstract

While business accelerators remain understudied in the academic literature, there is growing interest in understanding how accelerators work and where they provide value to entrepreneurs. In this paper, we focus exactly on this question ? we examine how mentorship and investor ties, two key aspects observed across accelerators in general lead to positive accelerator outcomes and through them, to long-term firm success outcomes for the start-ups participating in accelerators. Using the full cohort (n=105) of an international accelerator, we follow the progress of the startups during the accelerated period and continue to follow these startups for 15 months. We find that startups that participate more in mentorship events have higher likelihood of achieving short-term outcomes during the accelerator, such as the release of a prototype and generating revenue for the first time. Similarly, startups that develop more investor ties during the accelerator survive and raise capital at a higher rate. On the basis of these results, we provide practical implications for start-ups as well as managers of accelerator programs, in addition to theoretical contributions to entrepreneurship research.

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INTRODUCTION

Consider a team of entrepreneurs at the earliest stage of firm formation: the concept of the product and service is available, as are some technical and marketing resources within the team. However, it is not clear that such an entrepreneurial team will successfully make the transition to the next step, i.e. formulate a business plan, engineer a viable product, generate funding and acquire the first set of customers. Prior research shows that more than half of these new ventures will fail within five years (Aldrich and Reef 2006), some pegging the failure rates at over 90% (RIP Report, 2014). One significant institutional form has emerged in recent years to address this problem facing early-stage entrepreneurs – *business accelerators* (Cohen 2013). While accelerators remain understudied in the academic literature, there is concurrently increasing interest in understanding how accelerators work and where they provide value to entrepreneurs. In this paper, we focus on this question – we study how mentorship and investor ties, two vital aspects observed across accelerators in general (Cohen 2013), lead to positive accelerator outcomes and thereafter, to long-term positive outcomes for participating firms.

Business accelerators are short-term programs for new ventures that are characterized by three factors: a free and public online application to competitively select a cohort of participating startups; a standard deal terms that typically exchange a startup's equity for early-stage seed investment; an intense number of activities to speed the development of the startup's product and securing future funding (Miller and Bound, 2011). These unique characteristics set them apart from business incubators and angel investors, two alternative forms of early support (Cohen, 2012). Accelerators were first observed in 2005 (advent of Y-Combinator) and since then, the accelerator concept has expanded to become an important part of the entrepreneurial ecosystem (Cohen 2013). The number of accelerators in the US has grown from 51 in 2009 to over 200 in

2013 (Crunchbase 2014) and have collectively raised over $5B in investment while creating over 16,000 jobs since (Seed-DB, 2014). In 2012, there were a reported 1,700 seed-investment deals in the US, representing investments by accelerators in early-stage firms. Clearly, there is significant value that accelerators are providing to entrepreneurs and early case-based work suggests that this value accrues through three specific mechanisms (Miller and Bound 2011).

First, the accelerator incentivizes the relocation of the firm from its native ecology to that sponsored or hosted by the accelerator. While firms operating in their own environments are likely to be affected by the resources, competition and particular characteristics inherent therein (Chandler and Hanks 1994, Carroll and Khessina 2005), accelerators prefer to impose their own admittedly artificial and accelerated ecology on the entrepreneurs as a pre-condition for support. The artificially created ecology commonly imposed on all selected new ventures offer the other two distinguishing mechanisms – *mentorship* and *access to network ties* (Cohen 2013).

Mentorship has been studied in organizational settings and has been shown to influence outcomes such as turnover and organizational commitment (Payne and Huffman 2005, Carraher et al. 2008). Within the entrepreneurship literature, mentorship has been traditionally associated with business incubators (Amezcua et al. 2013) and angels (Mitteness et al. 2012). Early stage entrepreneurs may find mentors who provide them with tacit support, knowledge and expert advice in their own environments. However, these mentoring networks are heterogeneous and depend on how munificent these environments are (Castrogiovanni 1991). By comparison, the accelerator institutionalizes the accelerated provision of mentoring to all teams, based on a standardized process model. This approach, ideally, leads to the "acceleration" of entrepreneurial outcomes, thereby justifying the equity stake that the accelerator takes in the new venture. More

importantly, mentoring through co-location is a central process by which accelerators add value to entrepreneurs (Cohen 2013).

The second mechanism that accelerators provide is through the expedited creation of network ties that provide entrepreneurs with resources. Prior work in entrepreneurship argues that early-stage firms typically have difficulty identifying and procuring key resources from their own environments, such as funding, market intelligence, peer advice and potential customers (Stuart and Sorenson 2005). The accelerator solves this problem by providing, within its ecosystem, managed and expedited access to investors, angels and advisors (Cohen and Hochberg 2014). Since both investors and entrepreneurs are located within the accelerator ecosystem, the first-order information asymmetry problem is partially resolved (Shane and Cable 2002), creating a positive environment for entrepreneurs to gain accelerated access to investors. A critical part of accelerators, as opposed to incubators, is that they are of short duration. Therefore, participating firms have strong incentives in creating valuable investor ties since these are beneficial in the short run as firms "graduate" from accelerators. Thus, *access to investors*, and associated tie formation, is a significant mechanism through which accelerators add value.

In as much as these three mechanisms have been cited as critical within accelerators, there is no systematic evidence to show that new ventures that do invest in these experience positive accelerator-level outcomes. Cohen and Hochberg state as much: "While proliferation of such innovation accelerators is evident, the efficacy of these programs is far from clear", p2. Beyond accelerator-level outcomes, it is worth asking – do these programs ensure longer-term survival and success of the "graduating" new venture? Prior work has argued that mentoring and access to investor ties increase the odds of new venture success (Eesley and Wang 2014, Shane and Cable 2002) but this work is outside of the accelerator context. Within accelerators, it is

necessary from a policy and business perspective to understand what relationship exists between these mechanisms and accelerator-specific as well as longer-term outcomes. This forms the primary research question we address in this paper – *what is the effect of mentoring and investor tie formation within the accelerator on entrepreneurial outcomes of participant firms in the short term (within the accelerator) and the longer-term period?* Beyond the role of mentorship and investor ties, we also ask: *how do accelerator outcomes influence longer-term outcomes for participant firms?* If accelerators do indeed provide guidance in incentivizing firms towards accelerator-level outcomes, a positive correlation between achieving short-term outcomes inside the accelerator and longer-term entrepreneurial outcomes, such as firm survival should be evident. This forms our second research question.

We test our hypotheses using data collected in a unique manner within an accelerator. Consistent with the notion that studying entrepreneurship requires embedding the researcher within the institutional environment, we embedded ourselves into a focal accelerator as founders of a startup. From the unique perspective gained from our role as participants in the accelerator for over 6 months, we collected entrepreneur-specific data using surveys and social media. In total, we collected data on one entire cohort of 105 entrepreneurs hosted by the accelerator in the Spring of 2013. In addition to the data collected from the accelerator, we also tracked each startup in its post-accelerator phase for a period of 15 months to identify longer-term outcomes. Using these data, we estimate econometric models addressing the impact of mentorship and investor ties on accelerator-level and longer-term outcomes.

Since the accelerator we study utilizes the *lean startup* model (Ries 2011), we identify three accelerator outcomes associated with the lean startup approach – the development of a minimum viable product (MVP), a product launch and a first sale. Our results clearly indicate a

positive relationship between mentorship and short-term accelerator outcomes, such as the development of a MVP, a product launch and a first sale by the new venture. In addition, we observe that firms that experience significant investor tie formation attributable to the accelerator observe a higher likelihood of firm survival and investment at the 15-month period. Finally, we observe that firms with previous entrepreneurial experience gain less from mentoring and the formation of investor ties than inexperienced firms, indicating a significant moderating effect of prior entrepreneurial experience. In summary, our results provide for a more nuanced view of the impact of mentoring and investor tie formation on accelerator outcomes and longer-term firm survival.

Our work here makes several contributions to the entrepreneurship literature. First, we provide a validation of the accelerator model by showing the relationship between accelerator-level outcomes and those observed in the entrepreneur's unconstrained ecology in the form of firm survival, thereby providing indirect support for the existence of the accelerator effect (Lall et al. 2013). Second, we provide evidence of the relationship between mentoring and accelerator outcomes. Mentoring has traditionally been associated with all early-stage entrepreneurial support programs such as angel investing, incubators and venture capital. However, identification of the true effects of mentoring on outcomes is hard when entrepreneurs are embedded in their ecologies (Rodan and Galunic 2004) making the accelerator an ideal setting to identify the true effects of mentorship and ties.

Finally, our work contributes to the growing literature on seed accelerators by opening up the 'black box' of processes within accelerators such as mentoring and investor tie formation. Accelerators have caught the fancy of policy-makers and businesses alike in recent years for multiple reasons, not the least of which is the association implicitly made between accelerators

and general success in entrepreneurship. An example of this is the new Startup America initiative launched by President Obama in 2011 in partnership with TechStars[1]. Such initiatives are well-meaning but given the paucity of systematic research into the accelerator model (Cohen and Hochberg 2014), policymakers have few tools available to judge when certain activities lead to successful entrepreneurial outcomes with the accelerator and in the long-term. Our work here represents the first systematic analysis, to our knowledge, of outcomes associated with accelerators in the literature. The paper is structured as follows: first, we review our particular accelerator and research context. Second, we develop our hypotheses and review the related literature. Third, we describe our data collection methodology and survey instrument. Fourth, we explain our econometric models and results.

RESEARCH CONTEXT – STARTUP CHILE

Research Context

The setting for the analysis we provide in this paper is *Startup Chile*. Startup Chile is a government-sponsored accelerator located in Santiago, Chile. The program was created by the Chilean ministry of economy in 2010 with the goal of transforming Chile into the definite innovation and entrepreneurial hub of Latin America. After the success of a pilot in 2010, Startup Chile (SUP from now on) expanded to two rounds per year in 2011, each round lasting 6 months (StartupChile 2014). As of 2013, the program offers approximately $45,000 USD of seed capital, a one-year work visa, limited help getting into Chile and finding accommodation, and access to the network of investors, mentors, and entrepreneurs SUP has developed within Chile for participating entrepreneurs. In exchange for these resources, teams must remain in Chile while working on their startups for 6-7 months. Moreover, all startup teams are required to

[1] http://www.whitehouse.gov/startup-america-fact-sheet

engage in social impact activities in Santiago and in Chile, specified as part of the program and applicable to all firms, whether Chilean or not.

Since 2011, SUP has received over 10,000 applications from 112 countries and has supported over 900 startups from 63 countries. After several iterations, SUP has attracted considerable media and practitioner attention even outside the Chilean context[2]. Despite several "success stories" associated with accelerated start-ups (such as *Safer Taxi*, for instance[3]), there is a lack of systematic evidence of accelerated start-ups' entrepreneurial outcomes in the short and long term. More importantly, there is even less evidence linking the resources provided by the accelerator to these outcomes experienced by startups. This is the specific domain where we focus our analysis. As a starting point, we first define the appropriate set of accelerator outcomes that are of relevance here. Cohen (2013) reports that different accelerators tend to emphasize different methodologies or approaches to early-stage entrepreneurship. Therefore, we first contextualize accelerator-level outcomes to SUP's specific case next.

Defining Accelerator Outcomes

As startups advance through SUP, there are two main checkpoints on the progress of each startup. The first checkpoint is a meeting with an assigned financial advisor to agree on a set of objectives for the startup while in the accelerator. The disbursement of the first half of the funds provided by SUP depends on the successful completion of this meeting. These goals are heavily influenced by the principles in the *Lean Startup* methodology introduced by Eric Ries (2011), which we will now briefly introduce. Lean methodology is pervasive in SUP and other accelerators (Seed Ranking 2013).

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[2] See, for instance, the *Economist's* report on SUP: http://www.economist.com/node/21564589. A recent article on SUP in the *Washington Post*: http://www.washingtonpost.com/blogs/innovations/wp/2014/06/11/chile-teaches-the-world-a-lesson-about-innovation/

[3] http://pulsosocial.com/en/2013/02/19/start-up-chiles-safertaxi-brings-in-us4-2-million-investment/

The goals set by the startup with SUP's financial advisor depend on the current stage of the startup. For example, very early-stage startups are likely to arrive without an MVP, so one of the proposed goals is likely to be the development of an MVP. On the other hand, if the startup already has validated their MVP and would like to focus on ending experimentation and product development and officially launching the startup in a market, then the goal would be an official startup launch. Finally, if the startup has already launched, it's possible that the goal set is to focus on fundraising (i.e. launching a Kickstarter campaign). Therefore, typical goals for startups within the accelerator ecosystem include: *designing and completing a minimum viable product* (MVP), *launching the startup officially*, *increasing sales*, and *raising capital*, and these represent the three accelerator outcomes in this study. Note that these represent very early-stage outcomes associated with entrepreneurship in general; seed accelerators are particularly concerned with early-stage entrepreneurship and hence these outcomes reflect that approach. These outcomes are also discussed and evaluated in the second meeting that startups have with their financial advisors at SUP. Specifically, the advisor focuses on the extent to which the startup has fulfilled the goals established in the first meeting, after which the remaining seed capital is provided[4].

In addition to these short-term accelerator outcomes, we also identify longer-term entrepreneurial outcomes that are of interest to early-stage startups; specifically, these are the survival of the firm 15 months after the accelerator program, and the amount of external funding received in those 15 months. As significant antecedent factors of these outcomes, we discuss the role of mentorship and investor networking ties, both provided within the accelerator, in the next section.

HYPOTHESES DEVELOPMENT

[4] Occasionally, the accelerator chooses to not provide the remaining seed capital, especially in cases where no progress has occurred on achieving accelerator-level goals.

Within SUP, the creation of mentorship and investor ties arises as a result of multiple interactions. Regarding mentorship, as a first step, participating founders mentor each other. There is a high degree of collaboration among startup founders, and they give each other technical, programming, and business feedback. Second, SUP encourages joining a 'startup' tribe, which are specialized mentoring groups that meet every week to improve different aspects of the startup. These tribes are often led by previous SUP founders with particular areas of expertise. Third, SUP invites entrepreneurs, founders, investors, and VCs every week as speakers, who act as mentors and are available to startups as resources. Beyond mentoring, other events are focused on raising capital and connecting founders with investors. Here, the accelerator acts as a matchmaker between investors and startups, and it is common to meet visiting investors every week, especially investors visiting from the U.S. and South America. Social events, such as investor-sponsored parties, to foster interactions between founders and investors are encouraged though not officially sponsored by SUP.

While collaborating with other startups, actively participating in a startup tribe, reaching out to the invited speakers, and increasing one's investor network is highly encouraged, these are ultimately optional, allowing each startup considerable agency. The amount of mentorship received and the level of access to the investor network within SUP varies from startup to startup. One founder, for example commented this on the mentorship provided in the program:

> *"The network of mentors that SUP has compiled is the most compelling reasons to participate in this program. They were instrumental in helping us develop our MVP into a real product for real people" – An e-learning startup.*

While another founder thought very differently about the mentorship in SUP:

> *"The actual mentorship opportunities provided by SUP was one of my biggest disappointments in participating in this program. I thought they would tell us how to recruit developers and create an MVP. Instead, we were on our own most of the time" – A music streaming startup.*

These differences in perspective are interesting since they inform the validity of our analyses here, i.e. understanding how mentorship and access to investors influences outcomes. We propose formal hypotheses for these relationships next.

Mentorship: Access to Knowledge and Information

A fundamental challenge for entrepreneurs is to accurately identify and shape the opportunity that can then be pursued. Access to information about the value of available opportunities is a central part of this process. Extant work in entrepreneurship suggests that social networks provide this valuable and privileged information, i.e. the amount of private information and thus the ability to process this information accordingly and identify the right opportunities depends on the entrepreneurs network (Stuart and Sorenson, 2005). Field research conducted by us within the accelerator corroborates this argument and also indicates why mentorship is valuable to entrepreneurs within the accelerator. To apply to an accelerator, entrepreneurs need to provide an existing idea, which indicates that the entrepreneur has already identified an opportunity. However, identification of the opportunity is not a single-time initial event (Dubini and Aldrich 1991). Instead, the process of identifying the opportunity is a continuous cycle of stating, testing, and refining the target opportunity. In accelerators, mentors play a key role in the process of identifying the opportunity by providing feedback on the existing idea and by providing access to private information to further refine the idea or "pivot" into a similar but different area. One of the teams, for example, remarked:

> *"Sure, we came in part for the funds provided, but we also came to SUP because we needed help deciding where to focus. We were sure we had found the right opportunity in cloud security when we applied, but by the time we started meeting our mentors, it was obvious our idea was too general. The mentors helped us pivot into the more specific market of containerizing Dockers. Suddenly, instead of sounding like every cloud security startup out there, we found a specific need that we could solve" – A cloud services startup.*

After an opportunity is identified, the major challenge for entrepreneurs is the mobilization of resources to provide a solution for the opportunity. In pursuing the opportunity, the literature argues that entrepreneurs need to mobilize the tacit knowledge required to create a successful venture (Alvarez and Barney 2004). For example, entrepreneurs need to be able to concisely deliver their idea and execution, commonly refereed to as a "business pitch". In the case of the business pitch, while there are some common elements to successful pitches, there are elements tailored to the particular startup that are harder to codify. Therefore, a second mechanisms by which social networks affect the entrepreneurial process is by providing more channels through which tacit information flows (Stuart and Sorenson 2005), which in turn have been shown to positively affect entrepreneurial outcomes (Liles 1974; Klepper and Sleeper 2000).

Through continuous mentorship opportunities, entrepreneurs are coached in accelerators to develop this tacit knowledge in the form of business pitching, marketing and branding strategies, product development, and recruiting and managing resources. One of the health information technology (HIT) startups, for example, remarked:

> *"We got to Startup Chile with a great MVP, but we had no idea how to sell this product to physicians or patients. After we were assigned a mentor with experience in health IT, we started understanding how we should be approaching physicians, who were the key for the adoption of our product. For example, we started focusing on security and addressing privacy concerns for patient data. Before we joined SUP, we never thought security was a concern for our users." – A health IT startup.*

In summary, mentors in an accelerator can affect entrepreneurial outcomes by increasing the amount of private information to identify opportunities and the tacit information available to aggregate resources in a new venture. In the context of our accelerator, where startups target the completion of certain discrete accelerator outcomes and mentors are likely to emphasize these outcomes as well, we thus hypothesize that startups that engage in mentorship activities during the accelerator are more likely to achieve accelerator outcomes. Therefore, we propose:

Hypothesis 1a. Startups that engage in mentorship activities during the accelerator are more likely to release an MVP during the accelerator.

Hypothesis 1b. Startups that engage in mentorship activities during the accelerator are more likely to have an official product launch during the accelerator.

Hypothesis 1c. Startups that engage in mentorship activities during the accelerator are more likely to generate the first sale (i.e. new revenues) during the accelerator.

Investor Ties: Access to Financial and Labor Capital

In the process of mobilizing resources to pursue the entrepreneurial opportunities, one of the most salient needs for entrepreneurs is access to capital. Here too, social networks are influential for two reasons. First, investors use their network to become aware of investment opportunities. The more ties to investors that entrepreneurs possess, the more likely they will be able to raise awareness of their startups (Sorenson and Stuart 2001, Shane and Cable 2002). Therefore, a second mechanism by which social networks affect the access to financial capital is by providing information about an entrepreneur's work ethic and integrity (Hallen 2008). The benefits of these ties, even though institutionalized within the accelerator, are more likely to provide benefits in the longer-term and indeed may represent a continuing benefit of participation in an accelerator.

Our fieldwork in SUP further lends credence to the notion that social ties help entrepreneurs raise capital by exposing them to investors and creating trust between investors. As mentioned above, SUP hosts a number of professional and nonprofessional events to increase the number of investors in the entrepreneur’s social network. It is highly encouraged to share openly the startups ideas with investors and increase awareness of the entrepreneurial team. Moreover, throughout the months of the program, many such team-investor relationships strengthen and the perceived risk of investing in one of these startups decreases for investors. One startup stated:

> *"Since day one, the director [of Startup Chile] said that from now on we should always be on pitch mode. I didn't quite understand what he meant at the beginning, but after the first weeks there, I found myself meeting a lot people and investors who were always asking what our idea was. This was a radical change for our team as we never talked about our idea or product with strangers. In fact, we tried to keep as secret as possible. While the value of many of the social events sponsored by the accelerator was in question at the beginning, after the first two months in the accelerator, we had met more investors in these events than the last two years combined" – An online travel startup.*

We thus hypothesize that the investor networks provided in the accelerator increase the amount of capital available for the startup and thus its *longer-term* survival chances. In the short-term, i.e. within the accelerator, there may not be immediate benefits of such ties with investors with respect to accelerator-level outcomes. We focus on firm survival as it is one of the most widely used measures of firm success in the entrepreneurship literature (Wicker and King 1989; Bates and Servon 2000; Van Praag 2003; Bosma et al. 2004; Klepper, 2001; Shane and Stuart 2002). More formally, we propose the following set hypotheses:

Hypothesis 2a. Startups that engage in investor-ties building activities during the accelerator are more likely to survive in the longer-term.

Hypothesis 2b. Startups that engage in investor-ties building activities during the accelerator are more likely to raise other early-stage investment in the longer-term.

EMPIRICAL STRATEGY

Collecting detailed data from within accelerators represents a challenge for two reasons. First, most accelerator cohorts are relatively small (approximately 5-10 teams), which makes quantitative analysis infeasible. Second, it is generally hard to collect detailed data from teams within the accelerator and to observe the dynamics that exist within. These reasons also contribute to the relative paucity of research studying accelerators in detail (Cohen 2013). In this paper, we adopt a unique albeit different approach to collecting data. We embed ourselves in an accelerator, i.e. Startup Chile, as founders of a startup and collect data through surveys and

observation through the duration of the accelerator. From the rare perspective gained from our role as entrepreneurs in the accelerator over 6 months, we collected entrepreneur-specific data tracking the progress of startups during the program. One of the benefits of SUP also was in providing larger samples than usual – each cohort at SUP includes roughly over a 100 firms, allowing the possibility of quantitative analysis. Our tenure in the accelerator also allowed us to interact with the entire ecosystem of the accelerator (i.e. entrepreneurs, staff, mentors, investors) and gain access to not only direct information from the teams but also the information provided by the teams on social media sites (such as the firms' Facebook, Twitter, and LinkedIn pages as well as their goals and fundraising activity data on entrepreneurial platforms like *angel.co*).

Sample and Data Collection

The Spring 2013 cohort of Startup Chile served as the research setting for this study. To test our research models, we collected survey data from these startups. The survey that was used was developed through a thorough review of extant literature and interviews with entrepreneurs, the staff members at SUP, and administrators. As far as possible, we used questionnaire items that have been extensively tested in the literature (described later in this section). Before the eventual use of the survey, we pilot tested the survey with 20 entrepreneurs from the previous cohort of Startup Chile, the fall cohort of 2012. Due to some overlap in cohort co-location, some of these entrepreneurs were able to help by providing early feedback on the questionnaire items. The pilot was conducted in person after the entrepreneurs conducted their exit interview with SUP. Based on the feedback from the pilot and our interviews, we iteratively refined the survey instrument. These steps, combined with the fact that our survey items were taken from previous research, ensured the face and content validity of the questionnaire.

The relevant data used in analysis here was based on information prevalent at the end of the venture's stay at SUP, thereby allowing us to collect data on accelerator outcomes as well as perceptions of how much the team had actually invested in mentorship and investor ties, as opposed to intention. Data was collected in a single continuous wave as the startups conducted the exit interview with Startup Chile in the last three weeks of the program at the co-working space and the administrative offices in Santiago, Chile. While we initially attempted to collect survey data from all the official members, or those engaged in a contractual relationship with Startup Chile, of the venture team (between 1 and 3 members), this proved infeasible primarily because by the end of the accelerator, some members of the team had relocated back to their home country. This was a common occurrence, in that not all members of the new venture necessarily stayed in Santiago throughout the duration of the program. Moreover, SUP only required one official team member to complete the exit the interview to fulfill the terms and conditions.

We obtained a total of 175 questionnaires from the 105 firms representing the Spring 2013 cohort. Six surveys were discarded as they were from entrepreneurs from previous cohorts while ten more were discarded because non-founder members, such as interns, helped complete them. In nine cases, we had two founders fill out the survey while twelve firms had three founders fill the survey. For those firms with multiple respondents, we examined the correlations on the key perceptual questions across multiple respondents and found correlation coefficients of over 0.85, suggesting high levels of uniformity in responses. Therefore, for subsequent analyses, the responses from individual respondents on the same firm were averaged out to form the research variables. In summary, our dataset includes entrepreneurs from 13 different nationalities, a mean age of 28 years, from four races, and with varying levels of education (i.e.

some entrepreneurs had not finished bachelors degrees while other entrepreneurs held doctoral degrees). One of the common criticisms of entrepreneurship research is the relative homogeneity of the respondent pool (i.e. white males from a single state in the US); in contrast, here we capture a reasonably wide cross-section of racial and cultural backgrounds as part of the accelerator. We describe the specific variable operationalization next.

Variable Descriptions

Because of the large body of work covering mentorship in education and network ties in entrepreneurship, questionnaire items were adapted from existing scales whenever possible. As recommended in the mentorship literature, rather than employing a binary measure, mentorship was measured using the multi-dimensional mentorship functions questionnaire (MFQ-9) developed by Scandura and Ragins (1993). The MFQ-9 is a shorter version of the initial 20-item MFQ (Scandura, 1992). The MFQ measures three mentoring functions: career support, psychosocial support, and role modeling through using three items each, for a total of nine items. The instrument was measured in a 5-point Likert scale with responses ranging from 1 (*strongly disagree)* to 5 *(strongly agrees)*. The questionnaire items used to measure mentorship, and all other such variables, are provided in Table 1.

Similarly, to measure the development of network ties for the entrepreneurs during the accelerator, we adapted the measures used by Shane and Cable (2001), which measure direct and indirect ties between investors and entrepreneurs to the context of entrepreneurs in an accelerator. The direct and indirect ties were measured with six items in a 5-point Likert scale with responses ranging from 1 (*strongly disagree)* to 5 *(strongly agrees)*. The items pertained to the extent to which entrepreneurs were able to form professional, informal or friendship-based relationships with investor ties as a result of participating in the accelerator.

In addition to these two key independent variables, we also control for several contextual and demographic variables that have been found to be influential in increasing firm survival and rates of funding; we also use these variables as control variables in our models of accelerator outcomes. *Pre-entry experience* is measured using the scale from Dencker et al. (2009), which measures the entrepreneurial team' pre-entry knowledge of the business activity of the startup. Additionally, and related to pre-entry experience, we adapt a measure of organizational capital using Hsu (2007) to measure the *number of startups previously founded* by the founding team, the *age* (in months) of the startup, and the *average age (in years) of the founding team*. Also following Hsu (2007), we collect the *level of education* of the founding team (i.e. the number of members of the founding team possessing MBA and PhD diplomas). We also take into account team composition variables, and we adapt the measures from Campion et al. (1993) to control for the degree of *heterogeneity*, *flexibility*, *preference for group work*, and the *number of founding members* of the startup. Finally, we also asked entrepreneurs to provide what percentage of the seed funds provided by Startup Chile were spent on operations (i.e. rent, web storage, cloud services) and human resources (i.e. interns, salaries) – these represent two official accounting categories that entrepreneurs are requested to report to SUP, regarding disbursed funds. More details about these variables and their operationalization are shown in Table 1, while the summary statistics and a correlation table for the sample are shown in Table 2 and Table 3 respectively..

As a first step, we tested for the psychometric properties of the perceptual constructs to ensure that they were of good quality. With respect to reliability, for multi-item reflective constructs, the composite reliability was calculated and varied from 0.72 to 0.84 across constructs, thereby establishing their reliability. All Cronbach's alpha values obtained for the

constructs easily exceeded the 0.70 threshold established in the literature. To test divergent validity, we verified that the average variance extracted (i.e. the average variance shared between a construct and its measures) was greater than the variance shared with other constructs in the model, i.e. other perceptual constructs here (Fornell and Bookstein 1981). In addition, we performed exploratory factor analysis using varimax rotation and a threshold eigenvalue of 1.0 to ensure convergent validity; all hypothesized items loaded appropriately with high factor loadings on the underlying reflective construct, as shown in the first column of Table 4. Finally, we ensured the factor structure of the reflective constructs through confirmatory factor analysis using LISREL. All the hypothesized paths (loadings) from the indicator variables to the hypothesized latent variable were significant ($p<0.05$), with high goodness of fit indices, as shown in the second column in Table 4..

Dependent Variables

As described in the hypotheses development section, we focus on two sets of dependent variables in our analysis here. First, we collect data on short-term accelerator outcomes - *the release of an MVP*, the official *launch of the firm*, and the generation of revenue or *first sale* of the startup while participating in the accelerator. These outcomes are identified and collated in two ways: First, we extract data on outcomes from the accelerator calendar used by the startups in the cohort. For example, a startup would have on the calendar the release of an MVP and ask other accelerator startups for comments or feedback. Second, we include specific questionnaire items in our surveys on if and when the startup had released an MVP, launched officially, and generated revenue. Using these two sources, we are able to determine whether a startup accomplished these accelerator-level outcomes during the accelerator program. These dependent variables, *MVPDuring, LaunchDuring, and FSaleDuring,* are thus binary in nature, where a

value of 1 implies that the firm achieved the outcome during the accelerator and a value of 0 implies otherwise. In our startup cohort, we observe 72 startups releasing an MVP, 41 startups officially launching, and 33 startups generating revenue for the first time during the accelerator. Since we have a specific date of completion for each accelerator outcome, we are also able to establish the completion of accelerator-level outcomes before the startup joined the SUP program (*MVPBefore*, *LaunchBefore*, and FSaleBefore). These variables are used as predictor variables in the manner described in the next section. Table 5 shows whether these accelerator outcomes (MVP, launch, and first sale) are completed before the accelerator period, during the accelerator period, or not completed, for the startups in the cohort.

In addition to the data collected during the accelerator, we also tracked each startup in its post-accelerator phase for a period of 15 months to identify longer-term outcomes. We focus on two long-term outcomes: *firm survival* and *capital investment*, two variables that have been widely studied in the entrepreneurship literature (Shane and Stuart 2002; Delmar and Shane 2006; Agarwal et al. 2002). Survival is measured in two ways: first, survival is noted by suitably following the social media pages (i.e. Facebook, Twitter, and LinkedIn) of the startup where entrepreneurs give updates on the success or failure of the startup. Second, survival is confirmed by the entrepreneurs through a short email form where entrepreneurs confirm their startups continue to exist every 3 months. The response rate for the emails sent every 3 months to the cohort was approximately 90% on average. We find strong agreement (over 95%) between the reported measure of survival on social media and the email form. Therefore, we use survival noted from activity on social media as our survival variable, with the variable assigned 1 if the firm is found to be active on social media and 0 otherwise. In our cohort, we note that 63%, i.e. 66 startups, still survive at the end of the 15-month period.

Beyond survival, we also measure early stage capital investments received by the startup using Angel.co, a platform designed to showcase and raise capital for startups. The use of Angel.co is highly encouraged in Startup Chile and the entire cohort actively used it throughout the accelerated period and during the 15-month period where we followed the startup. As with survival, we also confirm new investments using the same short email format, where fellow entrepreneurs provide information about their current fund-raising status[5]. Again, we find a strong correlation (approximately 85%) between the reported measure of total investment in Angel.co and the email form. We define agreement between our two sources for investment as the investment in Angel.co being equal (to the nearest 1,000) to the reported investment in our email form. In the interest of consistency, we use the information from Angel.co as our measure of capital investments received by the startup in the 15-month period. Approximately, 75% of our cohort (78 startups) received early stage investment. The firms that do not raise any funds are excluded from the analyses in which investment is the dependent variable. The average amount raised by these startups in the 15-month period was approximately $225,000.

Following these startups after the accelerator is essential to our aim of understanding how the trajectory and actions of focal entrepreneurs in regard to engaging in mentorship and investor activities influences the long-term success of the startup. By considering funding in addition to survival, we address one of the gaps in the entrepreneurship literature that has thus far disproportionally focused on survival as the key venture performance criterion, with notable exceptions like Gimeno et al. (1997) and Aldrich and Ruef (2006). We discuss the econometric analyses conducted next.

MODELS AND RESULTS

[5] We note here that such email interactions are common amongst entrepreneurial teams from the same cohort and indeed, represents one of the advantages of the data collection approach we adopt here. As members of the accelerator's programs, we are able to use these networks that tend to be closed off to outsiders.

Using the data collected from SUP, we estimate econometric models addressing the impact of mentorship and investor ties on accelerator-level and longer-term outcomes. We now proceed to describe in detail the three model specifications pertaining to our three hypotheses. Model 1 tests the effects of mentorship and investor ties on short-term accelerator outcomes, while Model 2 focuses on longer-term outcomes.

Model 1: Accelerator Outcomes

Recall that we study how mentorship and investor ties affect three accelerator outcomes – *MVP*, *Launch* and First Sale (*FS*). Since these outcomes are discrete, we fit a logistic regression model for each accelerator outcome $k \in \{MVP, Launch, FS\}$:

$$\text{logit}(Y^k) = X\beta + Z\gamma + \epsilon,$$

where Y^k equals 1 when the outcome k is accomplished during the accelerator period and equals 0 when the outcome is *not* accomplished during the accelerator period. Startups that accomplished outcome k before the accelerator period are therefore excluded from the models. Specifically, we exclude 11 firms who have released an MVP before the accelerator, 9 firms who have launched officially before the accelerator, and 5 firms who have generated revenue before the accelerator. Additionally, the vector X contains the variables corresponding to pre-entry experience, education, team, resource allocation, mentorship, and investor ties as described above and Z includes indicators of whether previous accelerator outcomes were accomplished before or during the accelerator period.

Table 6 displays the coefficient estimates and standard errors for each explanatory variable as well as model fit indicators for the models corresponding to each accelerator outcome. The overall model fits are appropriately high, showing that the models explain a reasonable level of variance in the dependent variables. More specifically, we find that

Hypotheses 1a, 1b, and 1c are strongly supported; mentorship is significantly associated with each accelerator outcome ($p<0.01$ for all three models). However, investments in creating investor ties during the accelerator program are not significantly associated with any accelerator outcomes. Prior research indicates that pre-entry experience is a significant determinant of entrepreneurial decision-making and we see evidence of that as well – startups with greater pre-entry experience are more likely to achieve accelerator outcomes, significant at $p<0.05$. To examine if pre-entry experience moderates the relationship between mentorship and accelerator outcomes, we include an interaction term in the analysis. This interaction is highly significant as well, showing that the benefits from mentorship accrue less to startups with higher pre-entry experience.

Finally, we observe evidence of ordinal correlations, in that teams that achieve an MVP before the accelerator are more likely to launch by the conclusion of the accelerator, and teams that launch during the accelerator are more likely to achieve their first sale during the accelerator. With respect to the control variables, the results show that a greater number of members on the team with PhDs is negatively associated with accelerator outcomes ($p<0.10$) while the number of MBAs appears to have no significant effect. We also observe that more heterogeneous teams tend to achieve accelerator outcomes to a higher degree than homogenous teams ($p<0.1$), suggesting that team heterogeneity is an important characteristic to meet diverse accelerator outcomes, such as interacting with customers to develop an MVP and coordinating with the accelerator staff to launch the startup officially. Finally, teams that spend a higher percentage on human resources (i.e. salaries) show higher odds of achieving accelerator outcomes reflecting the importance of human capital rather than operational investments in achieving MVPs, official launches, and first sale outcomes. We consider the model for long-term outcomes next.

Model 2: Long-term Entrepreneurial Outcomes

Following a similar structure as before, we fit models of 15-month post-accelerator survival and capital investment with mentorship and investor ties as predictors. For survival we fit a logistic regression model,

$$\text{logit}(S) = X\beta + \epsilon,$$

where S equals 1 if the startup survived for at least 15-months after completion of the accelerator. For capital investment, we fit a linear regression model,

$$I = X\beta + \epsilon$$

where I is the total amount of capital investment in dollars received within 15 months after the completion of the accelerator. Table 7 displays coefficient estimates and standard errors as well as model fit indicators for both models. Here too, we see reasonably high model fit indices; the logistic Pearson's chi-square statistic is high while the OLS F-statistic is statistically significant, with a model R^2 of 0.76. Recall that Hypotheses 2a and 2b had argued that investor ties formed during the accelerator program are more likely to pay off in the longer term, through access to investments and survival. We see strong support for that logic here – the development of investor ties during the accelerator are significantly associated with both post-accelerator survival ($p<0.01$) and investment ($p<0.05$). Note that this stands in contrast with the results from Model 1, where investor ties had no significant effect on accelerator-level outcomes. Further, we see no evidence of correlations between mentorship within the accelerator program and long-term survival or investments in the startup, again in contrast with Model 1, where mentorship assumed primacy in ensuring accelerator-level outcomes.

As before, we observe that pre-entry experience has a significant positive effect on achieving survival and investments; startups are able to leverage their experiences to good effect.

Here again, we add an interaction term of pre-entry experience and investor ties to examine how pre-entry experience may act as a moderator; the results show that pre-entry experience does negatively moderate the relationship between between investor ties and survival ($p<0.1$) and investment ($p<0.05$), indicating that more experienced teams benefit less from establishing investor ties during the accelerator. Across both Model 1 and Model 2, we see an interesting role of pre-entry experience that has implications for how accelerators may choose to differentially conduct their programs for experienced and inexperienced startups within the program. With respect to control variables, we see that older startups survive longer and raise more capital than new ones ($p<0.1$) while firms with younger entrepreneurs on average tend to survive longer and raise more capital ($p<0.1$).

Endogeneity of Mentorship and Investor Ties Activities

If the investments in mentorship or acquiring investor ties were randomly distributed in the teams within the SUP cohort, the identification of the effect of these variables on outcomes would be straightforward. However, this is unlikely to be the case since arguably, participating in mentorship or investor activities during the accelerator program is likely reflective of unobservable quality or motivational factors within the entrepreneurial team. These unobservable factors could render the marginal effects of mentorship and investor ties on outcomes biased. To account for this possible endogeneity, we use an instrumental variables approach to test the robustness of our models. We need to identify an appropriate instrument for mentorship in Model 1, and for investor ties in Model 2.

For mentorship in model 1, we consider the home country of the entrepreneurial team (whether the team is Chilean or not) as an instrument. Our argument for this instrument is based on the observation that Chilean teams (approximately 30% of our sample) did not work as much

as other teams in the Startup Chile office space since they typically had their own offices, and as such, they participated in mentorship opportunities much less. By virtue of being in their own home environment and with access to their own private mentorship networks, they did not experience the same level of urgency to invest in mentorship during the accelerator program as international teams did, given the six month period of the accelerator. This observation fulfills the first requirement of a candidate instrument (correlated with the endogenous independent variable). However, Chilean teams selected into the accelerator through a merit-based process did not have a higher or lower likelihood a priori to achieve accelerator outcomes, thereby fulfilling the second requirement of a candidate instrument (no systematic relationship with the dependent variable). We therefore use this variable as an instrument for mentorship. Along similar lines of logic, we use this variable as an instrument for investor ties as well, based on the argument that Chilean teams did not work in the SUP offices and thus choose to not to participate in many of the opportunities to meet these investors. Therefore, this instrument is correlated with the investor ties variable but potentially unrelated to the firm's survival.

In the context of accelerator outcomes, the dependent variable is binary while the endogenous variable is continuous. Therefore, we use the instrumental variable probability model (IV-Probit) to instrument for mentorship. We follow the procedure outlined by Kleiber and Zeileis (2008), Cai (2010), and Zaghdoudi (2014), wherein the first stage involves regressing the endogenous variable on the instrument, and in the second stage, the outcome equation is estimated after correcting for endogeneity. Table 9 shows the results from the IV-probit analysis for accelerator outcomes. In the interest of clarity, we reproduce the results from the logistic model as well in the same table. As is evident, the magnitude of coefficients changes between logistic results and those from the IV-probit; this is not surprising since the IV-probit results are

conditional estimates (Kleiber and Zeileis 2008). However, the results are broadly consistent with those from the logistic regression, showing that mentorship is significantly associated achieving accelerator outcomes and that these outcomes accrue more to inexperienced firms. The consistency between the logistic and the IV-probit results lend further credibility to the obtained results.

For 15-month survival, which is also a binary outcome variable, we perform a similar IV-Probit analysis but for the endogeneity of investor ties here. The coefficient estimates, standard errors, and model fit indicators are shown in Table 9, along with the logistic regression results from Model 2. Here again, we observe changes in the magnitudes of the coefficients but the direction of influence on survival is highly consistent with the logistic model. Investor ties lead to significantly higher odds of survival in 15 months and this effect is stronger for relatively inexperienced firms. In addition, mentorship has no direct influence on survival. A Wald's chi-square test of exogeneity of investor ties dismisses the null of exogeneity ($p=0.002$), indicating that instrumenting for investor ties and obtaining consistent results shows robustness. In unreported regressions, we instrument for investor ties in the model for investments using 2SLS (since the dependent is continuous here). The results are entirely consistent with those reported in Table 7 and are available upon request from the authors.

DISCUSSION AND CONCLUSION

Accelerators, as an organizational form in entrepreneurship, represent an interesting yet important tension in the literature. On the one hand, they are increasingly popular and viewed as occupying a critical spot in the entrepreneurial process for very early-stage firms. On the other hand, there is considerable uncertainty regarding the outcomes associated with accelerator programs for participating firms, as well as lack of research on what specific processes within

accelerators are associated with success. For instance, in 2014, Startup Chile had over 3000 applications, with over 30% of the applications being from North American teams, representing a 50% increase from the applicants in 2011. This trend of increased interest in accelerators has been documented in the practitioner press as well (Crunchbase 2014). Furthermore, a recent report from the independent Small Business Office Administration (SBA), highlights the popular sentiment in policy circles around accelerators: "Accelerators' significant social capital contributions reduce the economic resources it takes for entrepreneurs to commercialize ideas". However, the very same report also describes the uncertainty that surrounds accelerators: "Accelerators do not always work in practice the way that we think they might in theory. There are many factors that affect the success and viability of startups" (Dempwolf et al 2014). These same opinions were expressed in one of our early interviews with an entrepreneur at SUP:

> *"It seems that no one can really tell us what we should do in the next six months. Should we just try to participate in as many social events and make as many friends as possible? Should we go home and code all day?" An entertainment startup.*

The work we present here aims to provide, to the best of our knowledge, the first empirical attempt to empirically link elements of the accelerator's internal processes with short-term and long-term entrepreneurial performance, thereby validating the accelerator model. Rather than making causal claims about the value accelerators provide all startups, we unpack the mechanisms by which accelerators impact teams participating in a major international accelerator along two dimensions. First, we show that access to, and investments in, mentorship can help teams improve their business ideas, build viable prototypes and achieve a first sale in the short term. Second, we provide evidence for the benefits of building deep investor ties through the accelerator program in the form of longer-term firm survival and funding. We demonstrate these relationships through a series of econometric models and robustness tests on data collected, through surveys and interviews, from all participating firms in an accelerator's

cohort, thereby providing for higher samples as well as deep domain knowledge by virtue of our dual role as researchers and participants in the accelerator.

Our work here also contributes to the literature on mentorship and organizational ecology. While mentoring has been previously studied in technology incubators and other early-stage entrepreneurial support programs (Amezcua et al. 2013), we focus on teams that have for the most part been relocated to a different country, and are thus able to better identify the true effects of mentoring on firm outcomes. Furthermore, following the advice of Stuart and Sorenson (2005) we measure more than one social tie as being important in for early-stage entrepreneurs. Thus, in addition to mentorship, we also study investor ties as sources of longer-term value. Since entrepreneurial survival has always been viewed as a key outcome in this literature, we integrate the development of mentorship and investor ties within the accelerator with previously identified relevant factors affecting survival, such as pre-entry experience. Though we do not provide hypotheses here, a consistent result we obtain pertains to the importance of pre-entry experience as a moderator, thus corroborating the work of Bayus and Agarwal (2007). We find across all our models that firms with high levels of pre-entry experience do not appear to gain as much from mentorship and investor ties, a result that adds nuance to the well-known work of Shane and Cable (2002) linking social ties to outcomes.

Apart from these theoretical contributions, we also believe our work has important implications for public policy, accelerators, and entrepreneurs. For policy makers, for example, as the SBA report on accelerator states, small businesses are viewed as key drivers of the economic health of the U.S., and the accelerator phenomenon has been cited nationally and internationally as an important part of the entrepreneurial ecosystem. However, policy makers have been unable so far to evaluate different accelerators because of the lack of empirical studies

understanding the mechanism by which accelerators provide value, beyond the initial seed investment (Cohen and Hochberg 2014).

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Figure 1. The Lean Startup Methodology Loop (Ries 2011)

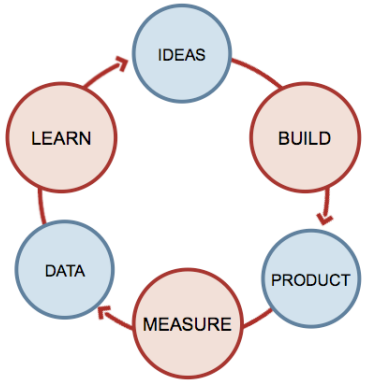

Figure 2. Theoretical Model of Mentorship, Investor Ties and Entrepreneurial Outcomes

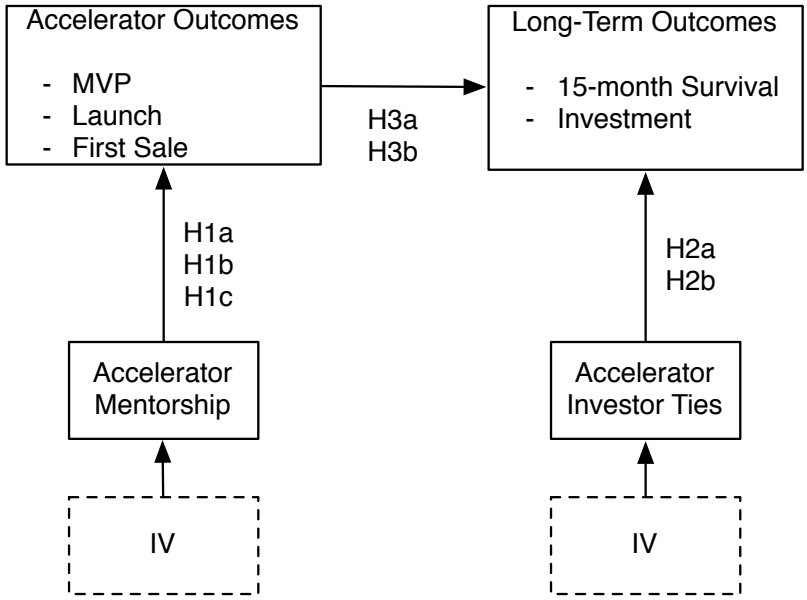

Table 1. Variable Descriptions and Questionnaire Items

Variable	Description	Item	Adapted From
PreEntry	Pre-entry knowledge of the business activity	1. How relevant is your prior work experience to your current work at the start-up? 2. How relevant is your education to your current work at the start-up? 3. How relevant are your hobbies or side activities to your current work at the start-up?	Dencker et al. (2009)
StartupExperience	Number of startups in the founders	Prior to this start-up, what is the number of start-ups founded by the founding team? (Count only as one (1) if two team members previously founded the same start-up)	Hsu (2007)
StartupAge	Number of months since the founding of the startup	In months, how old is your start-up?	
PersonalAge	Average age of founding team members	In years, what is the average age of the founding team?	
StartupMBAs	Number of MBA degrees in the founding team	What is the number of MBAs degrees in the founding team?	Hsu (2007)
StartupPhDs	Number of PhD degrees in the founding team	What is the number of doctoral degrees in the founding team?	
HeterogeneityAve	Team heterogeneity (i.e. diverse areas of expertise)	1. The members of my team vary widely in their areas of expertise. 2. The members of my team have a variety of different backgrounds and experiences. 3. The members of my team have skills and abilities that complement each other.	Campion et al. (1993)
FlexibilityAve	Team flexibility (i.e. able to fill each other jobs)	1. Most members of my team know each other's jobs. 2. It is easy for the members of my team to fill in for one another. 3. My team is very flexible in terms of changes in membership.	
PreferenceAve	Team preferences (i.e. preference for group work)	1. If given the choice, I would prefer to work as part of a team rather than work alone. 2. I find that working as a member of a team increases my ability to perform effectively. 3. I generally prefer to work as part of a team.	
TeamNumberOwners	Number of members in the founding team	What is the number of members of the founding team?	
ResourceOperations	Amount of seed money spent on operations	Approximately, what percentage of your incubator financial resources was/will be devoted to operations? (Assuming the definition of operations established by the Startup Chile Terms and Conditions)	-
ResourceHuman	Amount of seed money spent on human resources	Approximately, what percentage of your incubator financial resources was/will be devoted to human resources? (Assuming the definition of human resources established by the Startup Chile Terms and Conditions)	-

IncubatorMentor	Strength of mentorship (in term of career support, psychosocial support, and role modeling) from the mentors available in the accelerator	Career Support 1. My mentor takes a personal interest in my career 2. My mentor helps me coordinate professional goals. 3. My mentor has devoted special time and consideration to my career. Psychosocial Support 4. I share personal problems with my mentor. 5. I exchange confidences with my mentor. 6. I consider my mentor to be a friend. Role Modeling 7. I try to model my behavior after my mentor. 8. I admire my mentor's ability to motivate others. 9. I respect my mentor's ability to teach others.	Scandura and Ragins (1993)
NetInv	Strength of direct and indirect investor ties developed in the accelerator	Indirect Ties 1. Someone I met as a result of participating in the accelerator and whom I trust to discuss important confidential matters knows at least one investor 2. A third party I met as a result of participating in the accelerator and whose judgment I trust could provide me with nonpublic information investors 3. By calling people I know as a result of participating in the accelerator, I could obtain information about investors in a relatively inexpensive manner Direct Ties 4. I have a professional relationship with at least one potential investor as a result of participating in the accelerator 5. At least one investor was someone with whom I had engaged in informal social activity as a result of participating in the accelerator 6. At least one investor is a personal friend as a result of participating in the accelerator	Shane and Cable (2001)

Table 2. Summary Statistics

Variable Name	Unit or Scale	Mean	SD	C.R
PreEntry	5-point scale	3.220085	0.7179746	0.81
StartupExperience	No. startups	1.744444	0.738921	NA
StartupAge	Months	10.46739	6.184794	NA
PersonalAge	Years	28.58696	4.584139	NA
StartupMBAs	No. of degrees	0.2826087	0.452735	NA
StartupPhDs	No. of degrees	0.1195652	0.3262303	NA
HeterogeneityAve	5-point scale	3.659341	1.270732	0.75
FlexibilityAve	5-point scale	3.047619	1.081347	0.72
PreferenceAve	5-point scale	4.10989	0.8958821	0.77
TeamNumberOwners	No. of founders	2.296703	1.080067	NA
ResourceOperations	% Seed investment	41.11111	20.28972	NA
ResourceHuman	% Seed investment	43.5	19.30608	NA
Mentorship	5-point scale	3.5108696	0.7026209	0.84
NetInv	5-point scale	3.311111	1.494518	0.79

Table 3. Correlation Table

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IncubatorMentor	1.00													
NetInvInd	0.16	1.00												
PreEntryAve	0.24	0.21	1.00											
StartupExperience	0.09	0.05	0.15	1.00										
StartupAge	0.18	0.21	0.21	0.02	1.00									
PersonalAge	-0.07	-0.11	0.09	0.25	0.05	1.00								
StartupMBAsBin	0.05	0.02	0.16	0.05	0.06	0.18	1.00							
StartupPhDsBin	0.09	-0.05	0.25	0.00	0.01	0.11	0.22	1.00						
HeterogeneityAve	0.16	0.18	0.17	0.15	0.03	0.12	-0.04	0.06	1.00					
FlexibilityAve	0.23	0.23	0.23	-0.10	0.09	-0.16	-0.11	-0.08	0.17	1.00				
PreferenceAve	0.11	0.18	0.20	0.05	0.15	-0.04	0.04	-0.17	0.28	0.11	1.00			
ResourceOperations	0.18	0.12	0.17	-0.08	-0.02	-0.01	0.02	0.11	0.20	0.10	0.24	1.00		
ResourceHuman	-0.13	0.03	-0.15	0.15	0.03	-0.03	0.02	-0.17	-0.16	-0.18	-0.14	-0.65	1.00	
TeamNumberOwners	0.16	0.21	0.20	0.18	0.06	-0.16	-0.10	-0.09	0.11	0.25	0.16	0.05	0.09	1.00

Table 4. Exploratory and Confirmatory Factor Analysis of Reflective Constructs

Item (% variance explained)	EFA (Varimax rotation)	Confirmatory factor analysis measurement model standardized loadings (all items at p<0.05 level)					
Pre entry (65.4%)							
PE1	0.53	1*					
PE2	0.82	0.87					
PE3	0.74	0.73					
Heterogeneity (69.9%)							
Het1	0.87		1*				
Het2	0.92		0.88				
Het3	0.88		0.83				
Flexibility (68.3%)							
Flex1	0.66			1*			
Flex2	0.71			0.63			
Flex3	0.75			0.84			
Team Preference (72.1%)							
Pref1	0.89				1*		
Pref2	0.87				0.86		
Pref3	0.81				0.81		
Mentorship (85.9%)							
Men1	0.82					1*	
Men2	0.91					0.89	
Men3	0.92					0.88	
Men4	0.97					0.83	
Men5	0.96					0.86	
Men6	0.84					0.87	
Men7	0.68					0.73	
Men8	0.96					0.82	
Men9	0.89					0.92	
Investor Ties (79.2%)							
Inv1	0.92						1*
Inv2	0.92						0.83
Inv3	0.88						0.93
Inv4	0.86						0.84
Inv5	0.81						0.85
Inv6	0.85						0.87
* Fixed parameter for scale							
Chi-square (258 d.o.f) = 587.39, p<0.01							
Goodness of fit (adjusted goodness of fit) = 0.93 (0.91)							
Comparative fit index = 0.98							
Standardized root mean residual = 0.06							

Table 5. Accelerator Outcomes Breakdown

Accelerator Outcome	Before	During	Never	Total
MVP	11	72	22	105
Launch	9	41	55	105
First Sale	5	33	67	105

Table 6. Accelerator Outcomes, Logit Results

Variables	Model 1a: MVP	Model 1b: Launch	Model 1c: First Sale
	Estimated Values (SE)		
(Intercept)	-34.428 (13.086)**	-10.166 (4.468) *	-23.813 (113.491) *
PreEntryAve	5.286 (2.069) *	1.661 (0.962) *	5.551 (0.222) **
StartupExperience	0.394 (0.455)	0.181 (0.182)	0.096 (0.240)
StartupAge	0.288 (0.168).	0.198 (0.106) ψ	0.207 (0.140)
PersonalAge	0.369 (0.191).	-0.147 (0.089) ψ	0.037 (0.159)
StartupMBAsBin	-0.414 (1.118)	-0.807 (0.864)	-0.413 (1.653)
StartupPhDsBin	-4.358 (1.923) *	-1.811 (1.411) ψ	-0.307 (2.415) ψ
HeterogeneityAve	0.423 (0.262) ψ	0.956 (0.569) ψ	0.701 (0.28) ψ
FlexibilityAve	-0.628 (0.648)	1.069 (0.678)	-0.860 (4.37) ψ
PreferenceAve	0.688 (0.491)	-1.163 (0.612) ψ	1.043 (0.829)
ResourceOperations	0.133 (0.061)	0.039 (0.031)	0.094 (0.061)
ResourceHuman	0.070 (0.052) *	0.022 (0.033) ψ	0.116 (0.065) ψ
TeamNumberOwners	-0.474 (0.484)	0.647 (0.369) ψ	-0.647 (0.530)
Mentorship	21.829 (3.070) **	3.496 (0.915) **	3.048 (0.815) **
NetInv	0.218 (0.551)	-0.103 (0.331)	0.196 (0.576)
PreEntryAve x Mentorship	-6.391 (2.376) **	-1.093 (1.184) ψ	-3.399 (2.649) ψ
MVPBefore		4.447 (1.783) *	1.553 (2.367)
MVPDuring		2.642 (1.409) ψ	3.149 (2.09) ψ
LaunchBefore			3.137 (2.568)
LaunchDuring			3.798 (1.754) *
N	94	96	100
AIC	86.50	81.75	89.38
Pearson Chi^2 (d.o.f)	36.32 (78)	42.41 (80)	34.70 (84)
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 'ψ' 0.1			

Table 7. Survival and Investment Models

	Model 2a: Survival (Logistic)	**Model 2b: Investment (OLS)**
Variables	**Estimated Values (SE)**	
(Intercept)	-7.051 (4.190) ψ	-9.466 (5.001) ψ
Mentorship	0.091 (0.589)	0.733 (1.129)
NetInv	2.186 (0.112) **	1.640 (0.463) *
PreEntryAve	2.657 (0.262) *	2.003 (0.322) **
StartupExperience	-0.046 (0.165)	-0.037 (0.170)
StartupAge	0.133 (0.068) ψ	0.065 (0.049) ψ
PersonalAge	-0.078 (0.068) ψ	-0.081 (0.072) ψ
StartupMBAsBin	0.587 (0.668)	0.049 (0.648)
StartupPhDsBin	0.857 (1.010)	-0.577 (0.928)
HeterogeneityAve	-0.302 (0.313)	0.427 (0.287)
FlexibilityAve	0.092 (0.390)	0.055 (0.395)
PreferenceAve	-0.231 (0.345)	0.143 (0.390)
ResourceOperations	0.004 (0.019)	-0.001 (0.021)
ResourceHuman	0.003 (0.020)	0.033 (0.023)
TeamNumberOwners	0.044 (0.297)	0.107 (0.280)
NetInvInd x PreEntryAve	-0.600 (0.335) ψ	-0.290 (0.229) *
N	105	76
AIC / Adjusted R^2	68.25	0.73
Pearson Chi^2 (d.o.f)	46.81 (93)	32.26 (64)
F-Statistic (d.o.f.1, d.o.f.2)		22.18 (15, 75)***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 'ψ' 0.1		

Table 8. Accelerator Outcomes Model (with IV-Probit)

	Model 1a: MVP	Model 4a-IV: MVP	Model 1b: Launch	Model 4b-IV: Launch	Model 1c: First-Sale	Model 4c-IV: First-Sale
Model Type	**Logit**	**IV-Probit**	**Logit**	**IV-Probit**	**Logit**	**IV-Probit**
Variables	**Estimated Values (SE)**					
(Intercept)	-34.428 (13.086) **	-1.297 (0.506) *	-10.166 (4.468) *	0.577 (0.5183)	-223.813 (113.491) *	-0.623 (0.447)
PreEntryAve	5.286 (2.069) *	3.337 (0.121) **	1.661 (0.962) *	1.059 (0.125) *	5.551 (0.227) **	2.076 (0.107) **
StartupExperience	0.394 (0.455)	0.040 (0.029)	0.181 (0.182)	0.035 (0.029)	0.096 (0.240)	-0.009 (0.025)
StartupAge	0.288 (0.168).	0.016 (0.012)	0.198 (0.106) ψ	0.015 (0.008) ψ	0.20778 (0.140)	0.001 (0.007)
PersonalAge	0.369 (0.191).	-0.019 (0.008) *	-0.147 (0.089) ψ	-0.020 (0.011) ψ	0.037 (0.159)	0.001 (0.010)
StartupMBAsBin	-0.414 (1.118)	0.066 (0.111)	-0.807 (0.864)	0.087 (0.109)	-0.413 (1.653) ψ	-0.047 (0.094) ψ
StartupPhDsBin	-4.358 (1.923) *	-0.167 (0.160) ψ	-1.810 (1.411)	-0.162 (0.157)	-0.307 (2.415)	-0.150 (0.136) ψ
HeterogeneityAve	-0.423 (0.622)	-0.042 (0.048)	0.956 (0.569) ψ	0.013 (0.047)	0.701 (1.828)	-0.023 (0.040)
FlexibilityAve	-0.628 (0.648)	-0.071 (0.067)	1.069 (0.678)	0.051 (0.066)	-0.860 (0.37) ψ	-0.035 (0.057)
PreferenceAve	0.688 (0.491)	0.053 (0.060)	-1.163 (0.612) ψ	-0.121 (0.059) *	1.043 (0.829)	0.061 (0.052)
ResourceOperations	0.133 (0.061) *	0.002 (0.003) ψ	0.039 (0.031)	0.001 (0.003)	0.094 (0.061)	0.002 (0.002)
ResourceHuman	0.070 (0.052)	0.004 (0.003)	0.022 (0.033)	-0.003 (0.003)	0.116 (0.065) ψ	0.003 (0.003)
TeamNumberOwners	-0.474 (0.484)	0.003 (0.051)	0.647 (0.369) ψ	0.046 (0.049)	-0.647 (0.530)	0.009 (0.042)
Mentorship	21.829 (3.070) **	5.583 (0.468) **	3.496 (0.915) **	4.094 (0.494) **	3.048 (0.815) **	2.638 (0.422) **
NetInv	0.218 (0.551)	0.075 (0.046)	-0.103 (0.331)	0.010 (0.046)	0.196 (0.576)	0.012 (0.039)
PreEntryAve x Mentorship	-6.391 (2.376) **	-1.463 (0.143) **	-1.093 (1.184) ψ	-1.435 (0.150) *	-3.399 (2.649) ψ	-1.1548 (0.128) *
MVPDuring			2.642 (1.409) ψ	0.316 (0.116) **	3.149 (2.090) ψ	0.011 (0.105)
LaunchDuring					3.798 (1.754) *	0.415 (0.102) ***
N	94	94	96	96	100	100
AIC	86.5	67.2	81.75	59.1	89.38	75.2
Pearson Chi^2 (d.o.f)	36.32 (78)	21.77 (77)	42.41 (80)	23.40 (79)	36.28 (85)	34.70 (84)
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 'ψ' 0.1						

Table 9. IV-Probit for Model 2

	Model 2a: Survival (Logistic)	Model 5: Survival (IV-Probit)
Variables	**Estimated Values (SE)**	
(Intercept)	-7.051 (4.190) ψ	-3.006 (0.930)
Mentorship	0.091 (0.589)	0.067 (0.217)
NetInv	2.186 (0.112) **	5.091 (0.566) **
PreEntryAve	2.657 (0.262) *	1.948 (0.785) *
StartupExperience	-0.046 (0.165)	-0.059 (0.186)
StartupAge	0.133 (0.068) ψ	0.784 (0.100) ψ
PersonalAge	-0.078 (0.068) ψ	-0.041 (0.012) ψ
StartupMBAsBin	0.587 (0.668)	0.242 (0.335)
StartupPhDsBin	0.857 (1.010)	1.242 (1.472)
HeterogeneityAve	-0.302 (0.313)	-0.465 (0.474)
FlexibilityAve	0.092 (0.390)	0.025 (0.001)
PreferenceAve	-0.231 (0.345)	0.045 (0.004)
ResourceOperations	0.004 (0.019)	0.003 (0.016)
ResourceHuman	0.003 (0.020)	0.002 (0.041)
TeamNumberOwners	0.044 (0.297)	0.145 (0.162)
NetInv x PreEntryAve	-0.600 (0.335) ψ	-0.955 (0.215) ψ
N = 105		
AIC	68.25	43.98
Pearson Chi^2 (d.o.f)	22.12 (87)	27.88 (86)
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 'ψ' 0.1		