
DIFFERENT ASPECTS OF THE COMPOSITION OF
NASCENT ENTREPRENEURIAL TEAMS

Dissertation

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Summary

This dissertation is a collection of three stand-alone research papers written as part of the doctoral program in “Quantitative Economics and Finance” at the University of Konstanz during my time as a research assistant at the University of Vienna.

The focus of previous research on entrepreneurship has been almost exclusively on solo entrepreneurs and their individual characteristics and behaviors (Gartner, 1988; Birley and Stockley, 2000). The number of studies using teams as the unit of analysis is small (Davidsson and Wiklund, 2001; Chowdhury, 2005). And remarkably little attention has been paid to teams during the time that they are engaged in the entrepreneurial organizing activities. However, a large proportion of all newly founded ventures are started by teams (Ruef, Aldrich, and Carter, 2003). The literature on organizational and team behavior acknowledges the importance of team composition for business outcomes. The complex interactions among team members affect the behavior of each individual team member and therefore the performance of the team as a whole (e.g. Williams and O’Reilly, 1998). Accordingly, results from previous studies on solo entrepreneurs who create start-ups are not transferable to teams that do the same thing. This dissertation closes a gap in research on start-up teams while they are engaged in the process of creating new businesses. The present section provides a brief introduction to the following chapters and summarizes the main results.

Chapter 1 is based on the research paper *Formation of Nascent Entrepreneurial Teams: What Role Does the Level of Human Capital Play?* and analyzes the composition of nascent entrepreneurial teams according to individual levels of human capital. Classic human capital theory and signaling theory both posit a positive relationship between human capital and the successful completion of entrepreneurial organizing activities. The empirical analyses confirm these theoretical insights by indicating a highly significant positive relationship between the levels of human

capital in entrepreneurial teams and the probability of completing the process of new business creation. Upon this finding, this chapter builds two other insights on how nascent entrepreneurial teams are built, based on human capital levels of potential co-founders. The first insight is that nascent entrepreneurs look for co-founders whose level of human capital is very close to theirs. The second contribution is that the heterogeneity in human capital levels within start-up teams derives primarily from co-founders who have close social ties, such as relatives.

Chapter 2 originated as a research paper written together with Dr. Christian Hopp (University of Vienna) and entitled *Entrepreneurial Team Composition: It's Not Just What You Know, but also How Long You've Known the Co-Founders!* This chapter analyzes the compositions of start-up teams, and finds that persistent heterogeneity in levels of human capital is accompanied by high levels of social cohesion; considerations such as trust and shared understanding may be as important as pure human capital. Human and social capital cannot substitute for each other, but rather, the founder who exhibits a higher level of human capital satisfies the social capital needs for the new venture by enlisting members of his own social network. Individuals of higher ability also provide greater amounts of financial capital. This corroborates the observation that founders can strengthen their role within the venture by aligning managerial inputs with potential financial rewards and decision-making rights.

Chapter 3 comes from the research paper *Understanding the Dynamics of Nascent Entrepreneurship: Is It What You Know, or What You Do, or Both?*, another joint project with Dr. Hopp. This study analyzes the determinants underlying the process of creating a new business. It examines whether several elements of nascent entrepreneurs' human capital - formal education, labor market experience, and entrepreneurial experience - influence the rate of accomplishing the entrepreneurial activities, the tendency to concentrate these activities, and the overall timing of start-up activities. Moreover, the design of the founding process of new ventures and the level of human capital of the nascent entrepreneurs are linked with the likelihood of success. The results provide strong evidence that the most valuable type of human capital for new venture emergence is high task-related knowledge, such as entrepreneurial or labor market experience, while human capital has neither a

direct nor indirect effect on the likelihood of successful venture creation when it consists of low task-related knowledge such as formal education.

Zusammenfassung

Diese Doktorarbeit ist eine Sammlung von drei eigenständigen Forschungsarbeiten, welche als Teil des Promotionsprogrammes “Quantitative Economics and Finance” der Universität Konstanz während meiner Zeit als wissenschaftlicher Mitarbeiter an der Universität Wien entstanden sind.

Der Schwerpunkt der bisherigen Erforschung von Unternehmensgründungen hat fast ausschließlich auf Einzelgründern sowie deren Charakteristika und Verhaltensweisen gelegen (Gartner, 1988; Birley und Stockley, 2000). Die Zahl der Studien, bei denen Teamgründungen das Untersuchungsobjekt darstellen, ist sehr klein (Davidsson and Wiklund, 2001; Chowdhury, 2005). Und erstaunlich wenig Aufmerksamkeit wurde bis anhin auf Teams gelegt, welche sich noch im Prozess der Unternehmensgründung befinden. Dies erstaunt umso mehr, da ein Großteil aller Startups durch Teams gegründet werden (Ruef, Aldrich und Carter, 2003). Die Literatur zu Organisationsmanagement und Teamverhalten anerkennt die große Bedeutung der Teamzusammensetzung auf das Unternehmensergebnis. Komplexe Wechselwirkungen zwischen den einzelnen Teammitgliedern beeinflussen das Verhalten der einzelnen Personen und somit die Leistung des ganzen Teams (z.B. Williams und O’Reilly, 1998). Dementsprechend sind die Ergebnisse früherer Studien zu Einzelgründern nicht übertragbar auf Teams, welche sich noch im Prozess einer Unternehmensgründung befinden. Die vorliegende Dissertation schließt eine Lücke in der Erforschung von Teams, welche sich noch im Prozess der Gründung eines Unternehmens befinden. Dieser Abschnitt enthält eine kurze Einführung in die folgenden Kapitel und fasst die wichtigsten Ergebnisse zusammen.

Kapitel 1 basiert auf der Forschungsarbeit *Formation of Nascent Entrepreneurial Teams: What Role Does the Level of Human Capital Play?* und analysiert die Zusammensetzung von Teams bezüglich der individuellen Humankapitalausstattung während des Prozesses der Unternehmensgründung. Die klassische

Humankapitaltheorie wie auch die Signaling-Theorie postulieren einen positiven Zusammenhang zwischen Humankapital und dem erfolgreichen Abschluss der Gründungsaktivitäten. Die empirischen Analysen bestätigen diese theoretischen Erkenntnisse, indem ein hoch signifikanter, positiver Zusammenhang zwischen der Humankapitalausstattung und der Wahrscheinlichkeit der Gründung eines neuen Unternehmens gefunden wird. Neben dieser Erkenntnis präsentiert dieses Kapitel noch zwei weitere Einsichten, wie sich Teams, welche gemeinsam ein Unternehmen gründen, bezüglich der individuellen Humankapitalausstattung zusammensetzen. So suchen Jungunternehmer nach potentiellen Mitgründern, welche ein ähnliches Humankapitalniveau besitzen. Zudem stammt die Heterogenität bezüglich des Humankapitalniveaus in Gründungsteams hauptsächlich von den Mitgründern, zu denen eine sehr enge soziale Verbindung besteht, wie zum Beispiel Verwandten.

Kapitel 2 stammt aus der Forschungsarbeit *Entrepreneurial Team Composition: It's Not Just What You Know, but also How Long You've Known the Co-Founders!*, eine gemeinsame Studie mit Dr. Christian Hopp (Universität Wien). Es wird die Zusammensetzung von Gründungsteams analysiert und aufgezeigt, dass die beobachtete Heterogenität bezüglich dem Niveau an Humankapital innerhalb von Teamgründungen vor allem von denjenigen Geschäftspartnern verursacht wird, mit denen man einen engen sozialen Zusammenhalt hat; Überlegungen wie Vertrauen und blindes Verständnis scheinen ebenso wichtig zu sein wie das Humankapital. Darüber hinaus wird gezeigt, dass das verwendete Sozialkapital hauptsächlich von derjenigen Person stammt, welche ein höheres Niveau an Humankapital aufweist. Demnach können Human- und Sozialkapital nicht als Substitute betrachtet werden. Zudem bringen die Personen mit dem höheren Niveau an Humankapital auch einen größeren Betrag an Finanzkapital in das neu zu gründende Unternehmen ein. Dies bestätigt, dass Gründer mit einem höheren Niveau an Humankapital ihre Rolle innerhalb des Unternehmens stärken, indem sie einen größeren finanziellen Beitrag leisten, dadurch größere Entscheidungsbefugnisse bekommen aber auch einen größeren finanziellen Profit aus ihren Managemententscheidungen erhalten.

Kapitel 3 bezieht sich auf die Forschungsarbeit *Understanding the Dynamics of Nascent Entrepreneurship: Is It What You Know, or What You Do, or Both?*, eine weitere gemeinsame Studie mit Dr. Hopp. Diese Untersuchung analysiert die Determinanten des Prozesses bei der Gründung eines neuen Unternehmens. Es wird geprüft, ob verschiedene Elemente des Humankapitals der Gründer - formale Ausbildung, Arbeitsmarkterfahrung und unternehmerische Erfahrung - einen Einfluss auf die Geschwindigkeit der Ausführung der Gründungsaktivitäten, die Tendenz zur Konzentration dieser Tätigkeiten und das Timing der Gründungsaktivitäten haben. Darüber hinaus wird die Gestaltung des Gründungsprozesses und das Niveau des Humankapitals der Jungunternehmer mit der Wahrscheinlichkeit einer erfolgreichen Neugründung verbunden. Die Ergebnisse belegen, dass das Humankapital besonders wichtig für die erfolgreiche Gründung eines neuen Unternehmens ist, wenn es ein hohes aufgabenspezifisches Humankapital wie unternehmerische Erfahrung oder Arbeitsmarkterfahrung darstellt. Im Gegensatz dazu hat das Humankapital aber weder einen direkten noch indirekten Einfluss auf die Gründungswahrscheinlichkeit, wenn es sich aus niedrigem aufgabenspezifischem Wissen zusammensetzt, wie zum Beispiel formale Ausbildung.

CHAPTER 1

Formation of Nascent Entrepreneurial Teams: What Role Does the Level of Human Capital Play?

1.1 Introduction

One of the most frequently discussed subjects in the body of literature on nascent entrepreneurial teams is the formation of these teams. Many different aspects of the individual team members have been analyzed in terms of heterogeneity or homogeneity. Studies coming from a sociological perspective show that teams that are homogeneous with regard to various socio-demographic (gender, race, age, religion, etc.), behavioral, and intrapersonal characteristics perform better. They argue that similarity breeds connection and trust, and thus low levels of affective conflicts, leading to fewer changes in the composition of these teams and increased effectiveness and superior development of the new business (McPherson, Smith-Lovin, and Cook, 2001; Ruef, Aldrich, and Carter, 2003).

Other research with more of a resource-based view argues that the available knowledge of a firm increases in teams where the individual team members have complementary skills and experience. This research emphasizes the importance of heterogeneous human capital within teams not only because it increases the total knowledge, but also because the cognitive conflicts that ensue can lead to greater creativity and so to better performance (Kor and Mahoney, 2000; Foo, Wong, and Ong, 2005; Unger, Rauch, Frese, and Rosenbusch, 2009).

While numerous studies favor heterogeneity within entrepreneurial teams according to skills and experience, no research has been done to analyze the stock of human capital of each team member within entrepreneurial teams. The objective of this paper is to help close this research gap by examining the composition of nascent entrepreneurial teams according to their individual levels of human capital.

Using data from PSED II, a representative sample of nascent entrepreneurs who were in the process of creating a new venture, we have tested three hypotheses. Our findings indicate a highly significant and positive relationship between the levels of human capital in start-up teams and the probability of completing the entrepreneurial organizing activities successfully. Further, we find that start-up teams consist of co-founders having a similar level of human capital. Moreover, we observe that family ties mediate a possible lack of human capital when decisions

about potential co-founders are made, leading to significantly more heterogeneous nascent entrepreneurial teams.

The remainder of this article is structured in the following way: Section Two outlines the theoretical background of the analysis and derives the hypotheses. Section Three describes the dataset and explains the methodology used in this study. Section Four presents the results of the empirical analysis. And Section Five concludes the findings and presents implications.

1.2 Theory and Hypotheses

1.2.1 *Human Capital Levels and the Completion of Organizing Activities*

Human capital theory predicts that individuals with higher levels of human capital are generally more successful and have higher returns in their careers (Mincer, 1958; Schultz, 1959; Becker, 1964). According to this argument, the performance of nascent entrepreneurs must also be strongly influenced by their level of human capital. Human capital increases the cognitive abilities of entrepreneurs, leading to more productive and efficient activities. Therefore, if profitable opportunities for entrepreneurial activities exist, individuals with higher levels of human capital should outperform others in discovering them (Shane and Venkataraman, 2000). Moreover, once engaged in the entrepreneurial process, such nascent entrepreneurs should also have superior ability to successfully exploit these business opportunities (Gimeno, Folta, Cooper, and Woo, 1997; Davidsson and Honig, 2003; Unger, Rauch, Frese, and Rosenbusch, 2009). They should be better at mapping out a strategy as well as planning the entrepreneurial organizing activities (Baum, Locke, and Smith, 2001).¹ Moreover, signaling theory argues that potential stakeholders such as clients, subcontractors, and investors have imperfect information about the nascent venture they are considering dealing with. So these parties evaluate nascent ventures based on observable characteristics that they assume to be highly correlated with the unobservable quality factors of the new ventures (Baum and Silverman, 2004). Observable investments in human capital constitute such an indicator signaling production ability (Spence, 1974; Zacharakis and Meyer, 2000).

¹According to Pennings, Lee, and Van Witteloostuijn (1998), nascent entrepreneurs are residual claimants and thus have even a stronger incentive to use their human capital for the benefit of the new venture.

Accordingly, having a high level of human capital is helpful for acquiring other resources such as financial and social capital (Brush, Greene, and Hart, 2001). And lastly, having a certain level of human capital is a prerequisite for further learning, as it assists in the accumulation of new knowledge and skills (Hunter, 1986). In sum, the impact of human capital on the entrepreneurial organizing activities is likely to be caused by three underlying forces: productivity, signaling, and further knowledge accumulation. Accordingly, human capital is one of the core resources any new venture needs (Brush, Greene, and Hart, 2001; Haber and Reichel, 2007).

One aspect of entrepreneurial teams is the issue of lead entrepreneurs (Timmons, 1994; Ensley, Carland, Carland, and Banks, 1999; Harper, 2008). It has been suggested that lead entrepreneurs are essential to start-up teams for several reasons. First, lead entrepreneurs discover profit opportunities and formulate business conceptions (Ensley, Carland, and Carland, 2000), which are necessary to attract other team members (Gupta, MacMillan, and Surie, 2004). Second, lead entrepreneurs organize the entrepreneurial activities clearly, build entrepreneurial cultures, and communicate frequently (Timmons, 1999). Third, lead entrepreneurs have a willingness to take risks and a tendency to be proactive relative to business opportunities (Lumpkin and Dess, 1996). Hence, start-up teams with a lead entrepreneur achieve higher levels of venture performance (Eisenhardt and Schoonhoven, 1990; Ginn and Sexton, 1990). Duchesneau and Gartner (1990) find that successful lead entrepreneurs had attained higher levels of education, had obtained prior start-up and managerial experience, and possessed broad business skills. Moreover, Gimeno, Folta, Cooper, and Woo (1997) demonstrate that people who have invested a lot of time in their human capital want to receive an adequate compensation for their investments. Otherwise, they would seek other lucrative job opportunities. Therefore, they are likely to strive for more growth and profits in their start-up than individuals who have invested less in their human capital (Cassar, 2006). Taking these argumentations together, we formulate the following hypothesis:

Hypothesis 1a: *A higher maximal level of human capital in nascent entrepreneurial teams affects the completion of entrepreneurial organizing activities positively.*

The observation that a chain is only as strong as its weakest link can also be true for entrepreneurial teams. If entrepreneurial organizing activities are highly interdependent, or if some organizing tasks are divided and responsibility for different parts is assigned to different team members, then the performance of start-up teams depends on the human capital level of the weakest group member, no matter how well the other members perform their tasks (Neuman and Wright, 1999). The productivity of a whole team depends entirely on the weakest team member's productivity (Kremer, 1993; Fabel, 2004). Hence, the probability of successfully completing the entrepreneurial organizing activities is limited by the weakest link, and attention should be paid to the lowest level of human capital within entrepreneurial teams. We formulate the following hypothesis:

Hypothesis 1b: *A higher minimal level of human capital in nascent entrepreneurial teams affects the completion of entrepreneurial organizing activities positively.*

By forming start-up teams, individuals embed themselves in social structures in which they interact with each other. They think together in innovative ways (Basadur, 2004), mutually evaluate the tasks (Harper, 2008), and therefore fulfill the entrepreneurial organizing activities in a socially integrated process. They create a socially-extended cognitive nexus whose problem-solving features are different from those of its single members (Harper, 2008). The successful completion of the gestation process of a new venture clearly depends on the combination of the individual talents. Combining the skills and experience of different people in a start-up team transforms a business idea into a fledgling business (Cooney, 2005). Accordingly, for start-up teams that pool their efforts, a more appropriate measure for the group may be the average level of human capital. We formulate the following hypothesis:

***Hypothesis 1c:** A higher average level of human capital in nascent entrepreneurial teams affects the completion of entrepreneurial organizing activities positively.*

1.2.2 Homogeneity of the Human Capital Levels

Entrepreneurial teams use human capital to accumulate further knowledge (Ucbasaran, Lockett, Wright, and Westhead, 2003) and to leverage social and financial capital (Adler and Kwan, 2002). Accordingly, human capital is the core resource any start-up needs to develop a sustainable business (Brush, Greene, and Hart, 2001; Haber and Reichel, 2007). Consequently, founders have to look for individuals who have the adequate levels of human capital to optimize the performance of the start-up (Forbes, Borchert, Zellmer-Bruhn, and Sapienza, 2006). Due to their ownership stake in the start-up, founders have a strong incentive to compose their team in a way that generates satisfactory economic returns (Ucbasaran, Lockett, Wright, and Westhead, 2003). Therefore, a huge effort has to be made in the search process to identify the candidate with the adequate level of human capital.

According to this resource-based view, rational partner selection in entrepreneurial teams has to happen in the following way: Founders who have a higher level of human capital are able to offer a higher probability of a higher payoff to potential co-founders. Therefore, people prefer to apply to the nascent entrepreneur with the highest level of human capital. This nascent entrepreneur, behaving rationally, will choose the candidate with the highest level of human capital as a co-founder. In general, the founder with the highest level of human capital will attract the highest-level co-founders. And the founder with the lowest level of human capital will attract the lowest-level co-founders. As a theoretical result, in labor-market equilibrium, nascent entrepreneurial teams consist of co-founders with identical human capital levels (Fabel, 2004). We formulate the following hypothesis:

***Hypothesis 2:** All members of nascent entrepreneurial teams have the same level of human capital.*

1.2.3 *Heterogeneity of the Human Capital Levels*

The process of successfully completing the entrepreneurial organizing activities requires a series of judgments based on the available human capital as well as on the financial and social resources. But it involves also human interaction, cooperation, and coordination (Forbes, Borchert, Zellmer-Bruhn, and Sapienza, 2006). Accordingly, people play a critical role in determining the success of a new venture not only because of the resources they bring in, but also because of the interpersonal attraction and social connection. There is an inherent human desire to share close relations and trust (Ruef, Aldrich, and Carter, 2003), even though rational explanations call simply for resources. Larson and Starr (1993) argue that relationships play an important role in the search process for new team members, but they also maintain that the formation proceeds in accordance with the resource requirements.

Consequently, the level of human capital might be the main driver in the search for co-founders, but that search is affected by other factors, such as existing social relations. In fact, the literature on entrepreneurial team composition shows that nascent entrepreneurs tend to search for co-founders predominantly among family members, friends, and business associates (Kim and Aldrich, 2005; Aldrich and Kim, 2007; Parker, 2009). This search within pre-existing social networks may exert either positive or negative effects on the composition of the start-up team with respect to the level of human capital. On the positive side, friendship and kinship ties allow the start-up team to bring in people who would otherwise price their services beyond the reach of the start-up (Francis and Sandberg, 2000). Conversely, human capital tends to be less important as the social ties get more intimate (McPherson, Smith-Lovin, and Cook, 2001). Following both argumentations, we formulate the following hypothesis:

Hypothesis 3: *The heterogeneity in human capital levels within start-up teams derives from the co-founders' pre-existing social ties.*

1.3 Methodology

1.3.1 Dataset

The aforementioned hypotheses are tested using the characteristics of nascent entrepreneurial team members from the Second Panel Study of Entrepreneurial Dynamics (PSED II). The PSED II is a representative portrait of entrepreneurial activities in the United States that identifies individuals during their business creation processes. The dataset describes the characteristics of nascent entrepreneurs, documents their nascent entrepreneurial organizing activities, summarizes the types and amounts of resources they commit, and provides the characteristics of the potential new venture.²

There has been considerable debate over what exactly is meant by an entrepreneurial team (Vanaelst, Clarysse, Wright, Lockett, Moray, and S'Jegers, 2006). Kamm, Schumann, Seeger, and Nurick (1990) define entrepreneurial teams as “two or more individuals who jointly establish a firm in which they have a financial interest”. Gartner, Shaver, Gatewood, and Katz (1994) extend this definition to cover those individuals who have direct influence on strategic decisions. Ensley, Carland, and Carland (1998) combine both definitions by stating that individuals have to fulfill three criteria in order to be considered members of the entrepreneurial team. First, they must have jointly established the new venture. Second, they must have a financial interest. And third, they must have a direct influence on the strategic choice of the venture.³ Following these researchers, we operationalize the nascent entrepreneurial team definition by employing the PSED category “owners”. This yields a sample of 508 nascent entrepreneurial teams. Table 1 presents the number of nascent entrepreneurial teams itemized by team size and industry:

[Insert Table 1 about here]

²Detailed descriptions of the methods and sampling used to generate PSED II can be found in Gartner, Shaver, Carter, and Reynolds (2004).

³Other researchers have made the equity stake condition stricter and have imposed a minimum equity stake before one can be considered a member of the entrepreneurial team (Ucbasaran, Lockett, Wright, and Westhead, 2003).

1.3.2 Measures

Dependent Variables

To test the hypotheses presented in Section Two, we constructed three variables addressing the completion of entrepreneurial organizing activities, the human capital levels, and the homogeneity/heterogeneity of the human capital levels.

Completion of Entrepreneurial Organizing Activities

Researchers have discussed a wide variety of measures to determine the point at which a nascent venture shifts from the end of the entrepreneurial organizing activities into being an operational business: the ability to raise external money, the legal establishment of the new venture, the first sales, a positive cash flow, reaching the break-even point, etc. (Gartner and Carter, 2003).

Garnter (1988) argues that entrepreneurship should be understood as an economic activity and not as a label for a formal organization. Bygrave (1989) asserts that the only way to know whether the new venture will do steady business is to see if it generates a positive cash flow.⁴ Positive cash flows are also used in the PSED II as a criterion for identifying an operating business (Gartner, Shaver, Carter, and Reynolds, 2004). In this study, the completion of the entrepreneurial organizing activities is indicated when the start-up reaches a positive monthly cash flow for the first time. In the PSED II dataset, respondents were asked whether monthly revenues had ever exceeded monthly expenses (including the salaries for the owners) for their new venture, i.e., whether their new business ever had a positive monthly cash flow from operations.⁵

The dummy variable for completing the entrepreneurial activities is constructed from the questionnaires in 2006 (Wave B) and 2007 (Wave C), whereas the possible determinants are derived solely from the 2005 (Wave A) questionnaire. In this way, we prevent problems of reversed causality.

⁴Other researchers claim that cash flow has limitations as a measure of the completion of the entrepreneurial organizing activities. Bhidé (2000) argues that cash flow is not likely to be an early goal of most high-potential new ventures. Katz and Cabezuelo (2004) make the case that nascent entrepreneurs are not always sophisticated enough to calculate positive cash flows exactly.

⁵Question A35 in the PSED II dataset: What was the first month and year in which monthly revenue was greater than all monthly expenses, including salaries for the owners active in managing the business?

Homogeneity/Heterogeneity of the Human Capital Levels

The individual human capital index hcl_i (cf. the section “Human Capital Levels”, below) is used to calculate the homogeneity/heterogeneity of the human capital levels of every nascent entrepreneurial team. As a measure of homogeneity/heterogeneity, we calculate the standard deviation of the individual human capital levels hcl_i of every nascent entrepreneurial team j .

$$\text{Homogeneity}_j/\text{Heterogeneity}_j = \sigma(hcl_{j1}, hcl_{j2}, hcl_{j3}, \dots, hcl_{jX}) \quad (1.1)$$

Explanatory Variables

To test the hypotheses presented in Section Two, we constructed two variables addressing the human capital levels and the relationships of the owners.

Human Capital Levels

Based on theoretical arguments and empirical findings, the components of human capital that may provide a useful knowledge base for nascent entrepreneurial teams are formal education (e.g., Evans and Leighton, 1989; Dickson, Solomon, and Weaver, 2008), labor market experience (e.g., Gimeno, Folta, Cooper, and Woo, 1997; Shane, 2000; Bosma, van Praag, Thurik, and de Wit, 2004), and entrepreneurial experience (e.g., Robinson and Sexton, 1994; Bosma, van Praag, Thurik, and de Wit, 2004).⁶

Formal education increases cognitive abilities, and thus the probability of perceiving and exploiting business opportunities. In addition, formal education has a signaling effect for productivity in markets with incomplete information (Baum and Silverman, 2004). Hence, formal education is likely to have positive effects on firm emergence as well as firm performance (e.g., Dickson, Solomon, and Weaver, 2008). Formal education can be measured in regard to type as well as length. In empirical research, formal education is most often measured in length, i.e., years of

⁶ According to the meta-analytical review of Unger, Rauch, Frese, and Rosenbusch (2009), the most frequently-employed indicators of human capital were education (used 69 times), start-up/owner experience (31 times), industry-specific experience (22 times), management experience (21 times), and work experience (12 times).

schooling (e.g., Unger, Rauch, Frese, and Rosenbusch, 2009). Therefore, to operationalize formal education, the PSED II dataset question about the highest level of education of each team member of the start-up⁷ was recoded into number of years of education YE_i .⁸

Prior labor market experience is viewed as a source of tacit knowledge about general labor market rules, and about employment practices that can aid entrepreneurs while they are engaged in the entrepreneurial organizing activities. Having industry-specific experience implies familiarity with the industry rules and norms and being linked with a network of employees, suppliers, and customers. A well-developed network significantly facilitates the gestation process of a start-up (e.g. Gimeno, Folta, Cooper, and Woo, 1997; Shane, 2000; Bosma, van Praag, Thurik, and de Wit, 2004). Managerial experience enhances managerial capabilities. Hence, people who possess these kinds of experience should be better able to evaluate and deal with strategic issues (Haber and Reichel, 2007). To measure labor market experience with the PSED II dataset, an index is constructed using years of work experience in the industry in which the new venture is active $YWEI_i$ ⁹, years of full-time paid work experience $YPWE_i$ ¹⁰, and years of managerial, supervisory, or administrative responsibilities $YMSAR_i$ ¹¹ of all members of the nascent entrepreneurial teams.

Having entrepreneurial experience influences the discovery of business opportunities (Shane, 2000). Moreover, it provides knowledge about the gestation process of a new venture and therefore facilitates the development of the organizing routines and skills in which new ventures are initially disadvantaged (Delmar

⁷Question AH6 in the PSED II dataset: What is the highest level of education you have / NAME has completed?

⁸We recoded the variable so that: "1. Up to eighth grade" equals 8 years of education, "2. Some high school" equals 10 years of education, "3. High school degree" equals 12 years of education, "4. Technical or vocational degree" equals 14 years of education, "5. Some college" equals 14 years of education, "6. Community college degree" equals 14 years of education, "7. Bachelor's degree" equals 16 years of education, "8. Some graduate training" equals 17 years of education, "9. Master's degree" equals 17.5 years of education, and "10. Law, MD, PhD, EDD degree" equals 19 years of education.

⁹Question AH11 in the PSED II dataset: How many years of work experience have you / has NAME had in the industry where this new business will compete?

¹⁰Question AH20 in the PSED II dataset: How many years of full time, paid work experience have you / has NAME had?

¹¹Question AH21 in the PSED II dataset: For how many years, if any, have you / has NAME had managerial, supervisory, or administrative responsibilities?

and Shane, 2006). In addition, entrepreneurs with prior business ownership experience have broader social networks and are more effective in developing new network ties (Westhead and Wright, 1998; Mosey and Wright, 2007), which brings access to external resources. Accordingly, having entrepreneurial experience increases the likelihood of possessing the relevant competencies to successfully complete the entrepreneurial organizing activities. To construct a proxy for entrepreneurial experience with the PSED II dataset, an index is constructed utilizing the number of other businesses the person previously helped to start as an owner NSU_i ¹² and the number of other businesses the person currently own NB_i ¹³.

[Insert Table 2 about here]

To develop one overall measure of human capital for every nascent entrepreneurial team member, we calculate a human capital index hcl_i that captures the relevant sub-indices of formal education, labor market experience, and entrepreneurial experience. In constructing this human capital index, each of the six relevant indicators of human capital is mapped onto a scale of zero to one, where 0 is the minimum and 1 the maximum value for a specific indicator.¹⁴ To calculate the industry-specific weights for the sub-indices and the overall human capital index, we apply principal component analysis. The central idea of this analysis is to reduce the dimensionality of the interrelated indicators while retaining as much as possible of the variance in the resulting principal components. Therefore, the weights used for calculating the sub-indices and the overall human capital index hcl_i capture the variation as fully as possible.¹⁵

¹²Question AH12 in the PSED II dataset: How many other businesses have you / has NAME helped to start as an owner or part-owner?

¹³Question AH13 in the PSED II dataset: Besides the new business discussed in this interview, how many other businesses do you / does NAME own?

¹⁴The variables are transformed employing the formula $(X_i - X_{min}) / (X_{max} - X_{min})$

¹⁵The calculation methodology and the resulting industry-specific weights for the sub-indices and the overall human capital index are presented in the appendix.

$$\begin{aligned}
hcl_i = & \alpha \frac{YE_i - YE_{min}}{YE_{max} - YE_{min}} + \beta \left(\beta_1 \frac{YWEI_i - YWEI_{min}}{YWEI_{max} - YWEI_{min}} + \right. \\
& \left. \beta_2 \frac{YPWE_i - YPWE_{min}}{YPWE_{max} - YPWE_{min}} + \beta_3 \frac{YMSAR_i - YMSAR_{min}}{YMSAR_{max} - YMSAR_{min}} \right) + \\
& \gamma \left(\gamma_1 \frac{NSU_i - NSU_{min}}{NSU_{max} - NSU_{min}} + \gamma_2 \frac{NB_i - NB_{min}}{NB_{max} - NB_{min}} \right) \quad (1.2)
\end{aligned}$$

Table 3 shows the summary statistics for the human capital index. According to this index, the industry in which nascent entrepreneurial teams have the highest average level of human capital is the high-tech communications industry. This result is driven by an above-average level of formal education, labor market experience, and entrepreneurial experience. Other sectors with high human capital levels include industries like financial & insurance activities and manufacturing, mining & utilities. Labor market experience is especially high in manufacturing, mining & utilities. The industry with the lowest level of human capital is retail, restaurant, wholesale distribution & transportation. Nascent entrepreneurial teams in this industry have particularly low entrepreneurial experience.

[Insert Table 3 about here]

Relationships

The relationship between team members is operationalized as spouse, partner, relatives, friends or acquaintances, and strangers before joining the nascent entrepreneurial team, and is included as a set of four dummy variables, with strangers before joining the nascent entrepreneurial team as the reference group.¹⁶

¹⁶Question AH8 in the PSED II dataset: How would you describe your relationship with NAME – are you spouses, partners sharing a household, relatives living in the same household, relatives living in different households, friends or acquaintances from work, friends or acquaintances you have not worked with, strangers before joining the new business team, or do you have some other type of relationship?

Control Variables

In order to control for effects that might otherwise influence the regressions, we control for team size, gender, race, and industry.

It can be argued that larger teams have access to a larger basis of human capital (Cooper, Gimeno-Gascon, and Woo, 1994). This allows for more specialization in decision-making, which leads to better firm performance (Eisenhardt and Schoonhoven, 1990). Hence, team size is operationalized as the number of owners and is included as a set of three dummy variables, with a team size of two as the reference group.¹⁷

Gender has been found to have a significant effect on the probability of successfully completing the gestation process of a new venture (Boden and Nucci, 2000; Davidsson and Honig, 2003). Accordingly, gender is incorporated as a variable measuring the percentage of women within the start-up team.¹⁸

Race is a characteristic by which individuals categorize themselves and others (McPherson, Smith-Lovin, and Cook, 2001). But because of this social categorization, some minority and immigrant groups face discrimination and a lack of career opportunities (Aldrich and Waldinger 1990). Hence, they are forced to enter self-employment. The nationality of group members, too, has been found to have an influence on team processes and performances (Watson, Kumar, and Michaelsen, 1993). Therefore, race is included as a set of six variables to control for these effects.¹⁹

The importance of human capital may differ between industries. Investments in human capital might be especially important in knowledge-intensive industries, because knowledge and valid information reduce the uncertainty associated with innovation and dynamic environments (McMullen and Shepherd, 2006). Therefore, it is important to control for the nature of the environment in which

¹⁷Question AG2 in the PSED II dataset: How many total people or other businesses or financial institutions will share ownership of the new business?

¹⁸Question AH1 in the PSED II dataset: Is NAME male or female?

¹⁹Question AH4 in the PSED II dataset: Are you/Is NAME White, Hispanic/Latino, Black/African American, American Indian, Asian, or Pacific Islander?

the nascent entrepreneurial teams operates.²⁰ Accordingly, industry is included in the regressions as a set of eight dummy variables, with customer, consumer & business consulting or services as the reference group.²¹

1.3.3 Empirical Methodology

The empirical part of this paper consists of three separate analysis looking at the composition of nascent entrepreneurial teams according their individual levels of human capital.

As the completion of entrepreneurial organizing activities is measured on a binary scale, a multivariate logistic regression model with robust standard errors is used to analyze the link between the levels of human capital in nascent entrepreneurial teams and the completion of the gestation process. In addition, we control for the relationship between the team members, team size, gender, race, and industry.

To test Hypothesis 2, a set of randomly-composed teams is drawn up by combining all of the possible combinations of founders within each entrepreneurial team size. These randomly composed teams are the baseline against which the observed start-up teams are judged using tests of statistical significance. As a measure of homogeneity/heterogeneity among the different levels of human capital, the standard deviation across the individual human capital levels is calculated for every nascent entrepreneurial team. Wilcoxon-Mann-Whitney tests are applied to evaluate the extent to which the homogeneity/heterogeneity of the observed entrepreneurial teams is truly special or unusual.

OLS regression models with robust standard errors are estimated to analyze the influence of relationships in nascent entrepreneurial teams on the homogeneity/heterogeneity of the human capital levels. Additionally, we include dummies

²⁰Question AB1 in the PSED II dataset: Which of the following best describes this new business - would you say it is a retail store, a restaurant, tavern, bar, or nightclub, customer or consumer service, health, education or social service, manufacturing, construction, agriculture, mining, wholesale distribution, transportation, utilities, communications, finance, insurance, real estate, some type of business consulting or service, or something else?

²¹As Field (2005: 313) points out, in designs in which the group sizes are unequal it is important that the reference category contains a large number of cases to ensure that the estimates of the regression coefficients are reliable.

for team size, gender, race, and industry.

1.4 Results

Table 4 provides the descriptive statistics of our dataset for both the independent and dependent variables. Correlation across all explanatory variables is low, suggesting the absence of any relevant problem of multicollinearity.

[Insert Table 4 about here]

The first hypotheses claim that nascent entrepreneurial teams with higher levels of human capital have higher probabilities of completing successfully the entrepreneurial organizing activities. While controlling for a rich set of other factors, we find strong support for these hypotheses. Whether we estimate the regression with the maximum, minimum, or average level of human capital within nascent entrepreneurial teams, we get a highly significant positive relationship between the levels of human capital and the successful completion of the entrepreneurial organizing activities. This indicates that both the lead entrepreneur and the weakest group member significantly affect the group performance, meaning that the team as a whole influences the outcome. This finding is confirmed by the highly positive effect of the average level of human capital within start-up teams.

Examining the control variables in Table 5, we see that the successful completion of the entrepreneurial organizing activities is more likely if relatives are involved as co-founders in the nascent entrepreneurial team. Nascent entrepreneurial teams with kinship ties are more likely to succeed than any other kind of teams. Building a start-up team with American Indians significantly decreases the likelihood of completing the nascent entrepreneurial process. Moreover, start-up teams in the industry of retail, restaurant, wholesale distribution & transportation also have a highly negative probability of successfully completing the entrepreneurial organizing activities.

[Insert Table 5 about here]

Hypothesis 2 states that all members of nascent entrepreneurial teams have the same level of human capital. Within teams of two, whether calculated for teams with spouses, without spouses, or for teams of two in general, we find a level of heterogeneity which is lower to a highly significant degree than within randomly composed groups. The same holds true for teams of three. For teams of four and five, we find also lower levels of heterogeneity than in randomly composed groups, but no longer at conventional levels of significance. Accordingly, nascent entrepreneurs look for individuals whose level of human capital is very close to theirs. They may find it difficult to appreciate the value of co-founders having different levels of human capital. Hence, we can confirm that nascent entrepreneurial teams consist of team members with similar levels of human capital.

[Insert Table 6 about here]

Table 7 provides the regression results for Hypothesis 3. The findings show that when co-founders are relatives, the heterogeneity in levels of human capital increases to a highly significant degree. The coefficients are significant at the 1% level for the baseline model as well as for the model controlling for team size, gender, race, and industry.

Examining the control variables, we find that the heterogeneity of the nascent entrepreneurial teams increases significantly with the team size. In contrast, the heterogeneity of the human capital levels decreases to a highly significant degree when minorities such Hispanics/Latinos, Blacks/African Americans, or Pacific Islanders are starting a business. Moreover, the heterogeneity of human capital is significantly higher in industries like communications, construction, and real estate.

[Insert Table 7 about here]

1.5 Conclusion

This study provides an understanding of the composition of nascent entrepreneurial teams regarding the individual levels of human capital of the start-up members. Using data from PSED II, a representative sample of nascent entrepreneurs who were in the process of creating a new venture, we have tested three hypotheses. Our findings indicate a highly significant and positive relationship between the maximal, minimal, and average levels of human capital in start-up teams and the probability of completing the entrepreneurial organizing activities successfully. Further, we have explored how nascent entrepreneurial teams are composed based on the human capital levels of potential co-founders. In line with our expectations, we find that start-up teams consist of co-founders having a similar level of human capital. Moreover, we observe that family ties mediate a possible lack of human capital when decisions about potential co-founders are made, leading to significantly more heterogeneous nascent entrepreneurial teams.

These results may guide practitioners such as founding consultants and venture capitalists in their evaluation of the potential of start-ups. These practitioners attach great importance to the heterogeneity within entrepreneurial teams according to skills and experience, but for further guidance, they should also focus on the homogeneity of the individual levels of human capital. Moreover, reducing barriers to meeting people with complementary skills and experience but with the same level of human capital might positively affect the number of start-ups that emerge successfully.

Our study is not without limitations. While we focus on the initial composition of nascent entrepreneurial teams in regard to the individual levels of human capital, we do not test how the composition of teams changes over time (Ucbasaran, Lockett, Wright, and Westhead, 2003; Chandler, Honig, and Wiklund, 2005). Empirical research suggests that turnover most often occurs when teams are diverse in terms of socio-demographic, behavioral, and intrapersonal characteristics. They argue that heterogeneity in these personality traits decreases social integration and consequently leads to affective conflicts and then to changes in the composition of the start-up team (McPherson, Smith-Lovin, and Cook, 2001; Ruef, Aldrich, and

Carter, 2003). But adding and dropping team members can also be a way of allowing the nascent entrepreneurial team to adapt the start-up's knowledge resources. Therefore, it would be interesting to take a more dynamic view and study changes to the initial entrepreneurial team composition according to the level of human capital.

In conclusion, this paper provides new insights into the understanding of the composition of nascent entrepreneurial teams. We depict how and why the level of human capital plays an important role in the formation of start-up teams, leading to homogeneous entrepreneurial teams according to the individual levels of human capital. Hence, when one takes on the task of founding a new business, it could be advantageous to consider homogeneity not only in socio-demographic, behavioral, intrapersonal characteristics, but also in the levels of human capital of the team members.

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1.A Appendix

Principal Component Analysis

Following Jolliffe (1986), we suppose that x is a vector of p random variables and Σ is the known covariance matrix. The first step in the principal component analysis is to look for a linear function $\alpha_1'x$ of the elements of x which has maximum variance:

$$\max \sigma^2(\alpha_1'x) = \max \alpha_1'\alpha_1\sigma^2(x) = \max \alpha_1'\Sigma\alpha_1$$

It is obvious that a constraint for α_1 must be imposed. The most convenient constraint is $\alpha_1'\alpha_1 = 1$. To maximize $\alpha_1'\Sigma\alpha_1$ subject to $\alpha_1'\alpha_1 = 1$, we use the technique of Lagrange multipliers and maximize:

$$\max L = \alpha_1'\Sigma\alpha_1 - \lambda(\alpha_1'\alpha_1 - 1)$$

Differentiation with respect to α_1 gives:

$$\Sigma\alpha_1 - \lambda\alpha_1 = 0$$

or

$$(\Sigma - \lambda I_p)\alpha_1 = 0$$

where I_p is the ($p \times p$) identity matrix. Thus, λ is an eigenvalue of Σ and α_1 is the corresponding eigenvector.

Remember, the equation to be maximized is:

$$\max \sigma^2(\alpha_1'x) = \max \alpha_1'\Sigma\alpha_1 = \max \alpha_1'\lambda\alpha_1 = \max \lambda\alpha_1'\alpha_1 = \max \lambda$$

So, the eigenvalue λ of Σ must be as large as possible. Thus, α_1 is the eigenvector corresponding to the largest eigenvalue λ of Σ . And therefore, the weights w_m used for calculating the sub-indices and the overall human capital index are:

$$w_m = \frac{\alpha_{1m}}{\sum_{i=1}^p \alpha_{1i}}$$

Weights of the Human Capital Index

	Formal Education
Agriculture	25.55%
Communications	47.82%
Construction	30.99%
Cust., Cons. & Bus. Cons. or Serv.	32.91%
Financial & Insurance Activities	17.52%
Health, Education or Social Services	29.28%
Manufacturing, Mining & Utilities	30.17%
Real Estate	24.44%
Retail, Rest., Wholes. Dist. & Trans.	23.48%

	Labor Market Experience	Years of Work Exp. in the Relevant Industry	Years of Full-Time Paid Work Experience	Years of Manag., Superv., or Admin. Responsibilities
Agriculture	38.84%	26.06%	37.20%	36.74%
Communications	44.22%	31.08%	34.50%	34.42%
Construction	32.86%	28.47%	35.52%	36.01%
Cust., Cons. & Bus. Cons. or Serv.	35.59%	25.98%	37.54%	36.48%
Financial & Insurance Activities	40.29%	30.31%	34.19%	35.50%
Health, Education or Social Services	38.91%	29.25%	36.01%	34.74%
Manufacturing, Mining & Utilities	33.91%	22.19%	40.16%	37.65%
Real Estate	36.95%	28.29%	35.27%	36.44%
Retail, Rest., Wholes. Dist. & Trans.	39.06%	29.51%	34.69%	35.80%

	Entrepreneurial Experience	Number of Other Businesses Helped to Start as an Owner	Number of Other Businesses be Owned
Agriculture	35.61%	50.00%	50.00%
Communications	7.96%	50.00%	50.00%
Construction	36.15%	50.00%	50.00%
Cust., Cons. & Bus. Cons. or Serv.	31.50%	50.00%	50.00%
Financial & Insurance Activities	42.19%	50.00%	50.00%
Health, Education or Social Services	31.81%	50.00%	50.00%
Manufacturing, Mining & Utilities	35.92%	50.00%	50.00%
Real Estate	38.61%	50.00%	50.00%
Retail, Rest., Wholes. Dist. & Trans.	37.46%	50.00%	50.00%

Table 1: Number of Nascent Entrepreneurial Teams

	Team of 2	Team of 3	Team of 4	Team of 5	Total
Agriculture	26	4	2	0	32
Communications	7	1	1	0	9
Construction	28	4	2	0	34
Customer, Consumer & Business Consulting or Services	157	23	14	4	198
Financial & Insurance Activities	7	2	1	0	10
Health, Education or Social Services	22	5	2	0	29
Manufacturing, Mining & Utilities	27	4	4	1	36
Real Estate	18	3	5	0	26
Retail, Restaurant, Wholesale Distribution & Transportation	105	19	9	1	134
Total	397	65	40	6	508

Table 2: Indicators of Human Capital from the 2005 Questionnaire of PSED II (Wave A)

Formal Education
Years of education $Y E_i$ (AH6)
Labor Market Experience
Years of work experience in the relevant industry $Y W E I_i$ (AH11)
Years of full-time paid work experience $Y P W E_i$ (AH20)
Years of managerial, supervisory, or administrative responsibilities $Y M S A R_i$ (AH21)
Entrepreneurial Experience
Number of other businesses helped to start as an owner $N S U_i$ (AH12)
Number of other businesses be owned $N B_i$ (AH13)

Table 3: Summary Statistics of the Sub-Indices and the Human Capital Index

	N	Formal Education		Labor Market Experience		Entrepreneurial Experience		Human Capital Index		
		Mean	Max.	Mean	Max.	Mean	Max.	Mean	Std. Dev.	Min.
Agriculture	32	0.561	0.523	0.273	0.120	0.305	0.097	0.104	0.523	
Communications	9	0.660	0.610	0.347	0.191	0.439	0.160	0.076	0.610	
Construction	34	0.522	0.605	0.223	0.111	0.291	0.106	0.086	0.605	
Cost., Cons. & Bus. Cons. or Serv.	198	0.591	0.589	0.211	0.050	0.295	0.090	0.097	0.589	
Financial & Insurance Activities	10	0.747	0.587	0.278	0.157	0.335	0.137	0.111	0.587	
Health, Education or Social Services	29	0.593	0.560	0.258	0.061	0.304	0.113	0.087	0.560	
Manufacturing, Mining & Utilities	36	0.496	0.551	0.349	0.119	0.335	0.113	0.128	0.551	
Real Estate	26	0.590	0.527	0.245	0.087	0.290	0.101	0.112	0.527	
Retail, Rest., Wholes. Dist. & Trans.	134	0.547	0.585	0.240	0.040	0.263	0.099	0.047	0.585	
Total	508	0.571	0.610	0.241	0.068	0.293	0.103	0.047	0.610	

Table 4: Descriptive Statistics and Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12
(1) Maximal human capital	1.000											
(2) Minimal human capital	0.348	1.000										
(3) Average human capital	0.239	0.101	1.000									
(4) Completion of Activities	0.293	0.103	0.892	1.000								
(5) Heterogeneity of the Human Capital Levels	0.156	0.363	0.079	1.000								
(6) Spouse	0.051	0.044	0.275	0.095	1.000							
(7) Partner	0.530	0.030	0.030	0.002	-0.090	1.000						
(8) Relatives	0.073	0.260	-0.113	-0.016	-0.053	-0.297	1.000					
(9) Friends or Acquaintances	0.217	0.412	0.169	0.008	0.339	-0.338	-0.111	1.000				
(10) Team of 3	0.313	0.464	0.020	-0.002	-0.009	0.011	-0.554	-0.075	1.000			
(11) Team of 4	0.128	0.334	0.064	0.044	0.186	-0.194	-0.062	0.256	0.288	1.000		
(12) Team of 5	0.079	0.270	0.126	0.011	0.231	-0.134	0.031	0.254	0.165	-0.112	1.000	
(13) Women	0.012	0.108	0.075	-0.003	0.049	0.030	-0.031	0.075	0.083	-0.042	-0.032	1.000
(14) Hispanic/Latino	0.392	0.261	-0.026	-0.015	-0.024	-0.054	0.384	-0.076	-0.323	0.014	-0.013	-0.080
(15) Black/African American	0.040	0.149	-0.188	-0.205	-0.218	0.014	-0.046	0.052	0.045	0.085	0.029	-0.030
(16) American Indian	0.104	0.280	-0.172	-0.117	-0.167	-0.090	-0.109	0.052	-0.022	-0.008	0.049	-0.041
(17) Asian	0.042	0.145	-0.105	-0.112	-0.061	-0.019	-0.032	0.016	-0.000	-0.055	-0.021	-0.032
(18) Pacific Islander	0.014	0.094	-0.030	0.003	-0.024	-0.128	0.024	-0.002	0.092	0.037	0.010	-0.017
(19) Agriculture	0.005	0.041	-0.066	-0.017	-0.046	0.038	-0.031	-0.006	0.001	-0.043	0.003	0.115
(20) Communications	0.063	0.243	0.034	0.030	0.045	0.037	0.066	0.021	-0.105	-0.002	-0.016	-0.028
(21) Construction	0.018	0.132	0.195	0.146	0.106	-0.023	0.020	0.002	0.038	-0.007	0.016	-0.015
(22) Financial & Insurance Activities	0.067	0.250	0.032	-0.044	-0.007	-0.090	-0.014	0.070	-0.045	-0.008	-0.020	-0.029
(23) Health, Education or Social Services	0.020	0.139	0.046	0.051	0.057	-0.037	-0.040	-0.006	0.027	0.031	0.011	-0.015
(24) Manufacturing, Mining & Utilities	0.057	0.232	0.021	0.027	0.035	0.020	-0.069	-0.068	0.053	0.033	-0.009	-0.027
(25) Real Estate	0.071	0.257	0.098	0.111	-0.013	0.024	-0.048	0.004	0.062	-0.014	0.033	0.041
(26) Retail, Restaurant, Wholesale Distribution & Transportation	0.051	0.221	-0.078	-0.006	0.141	-0.067	0.004	0.073	0.074	-0.009	0.098	-0.025
	0.264	0.441	-0.173	-0.134	-0.084	0.000	0.056	-0.011	-0.019	0.025	-0.026	-0.024

Variables	13	14	15	16	17	18	19	20	21	22	23	24	25	26
(13) Women	1.000													
(14) Hispanic/Latino	-0.041	1.000												
(15) Black/African American	0.060	-0.013	1.000											
(16) American Indian	0.008	0.023	-0.068	1.000										
(17) Asian	-0.083	-0.002	-0.043	-0.028	1.000									
(18) Pacific Islander	-0.005	0.030	-0.042	-0.011	0.035	1.000								
(19) Agriculture	0.056	0.020	-0.096	-0.019	-0.040	-0.029	1.000							
(20) Communications	-0.035	0.036	-0.047	-0.036	-0.019	-0.014	-0.035	1.000						
(21) Construction	-0.060	0.033	0.013	-0.005	-0.013	0.034	-0.069	-0.036	1.000					
(22) Financial & Insurance Activities	-0.077	-0.039	-0.010	-0.041	0.129	-0.016	-0.037	-0.019	-0.038	1.000				
(23) Health, Education or Social Services	0.091	-0.036	0.103	-0.027	-0.038	-0.028	-0.064	-0.033	-0.066	-0.035	1.000			
(24) Manufacturing, Mining & Utilities	0.026	-0.039	-0.096	0.012	-0.006	0.007	-0.072	-0.037	-0.074	-0.039	-0.068	1.000		
(25) Real Estate	-0.068	-0.043	-0.038	-0.021	-0.036	-0.026	-0.060	-0.031	-0.062	-0.033	-0.057	-0.064	1.000	
(26) Retail, Restaurant, Wholesale Distribution & Transportation	0.084	0.054	0.069	0.076	-0.029	0.070	-0.155	-0.080	-0.160	-0.085	-0.147	-0.165	-0.139	1.000

Table 5: Multivariate Logistic Regression with Robust Standard Errors
 Dependent Variable = Completion of Organizing Activities

Variables	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Maximal Human Capital Level	2.096*** (0.724)		
Minimal Human Capital Level		1.708** (0.747)	
Average Human Capital Level			2.114*** (0.767)
Spouse	0.009 (0.205)	0.140 (0.205)	0.083 (0.204)
Partner	0.067 (0.510)	0.168 (0.512)	0.137 (0.510)
Relatives	0.535* (0.288)	0.734** (0.285)	0.648** (0.283)
Friends or Acquaintances	0.040 (0.265)	0.114 (0.262)	0.084 (0.263)
Team of 3	-0.563 (0.414)	-0.410 (0.415)	-0.485 (0.413)
Team of 4	-1.111* (0.623)	-0.849 (0.607)	-0.941 (0.604)
Team of 5	0.447 (0.876)	0.575 (0.865)	0.504 (0.863)
Women	-0.169 (0.223)	-0.178 (0.222)	-0.169 (0.223)
Hispanic/Latino	-0.057 (0.505)	-0.138 (0.503)	-0.074 (0.505)
Black/ African American	-0.467 (0.302)	-0.525* (0.302)	-0.485 (0.302)
American Indians	-1.557** (0.723)	-1.589** (0.723)	-1.574** (0.725)
Asian	-0.299 (0.984)	-0.342 (0.969)	-0.312 (0.976)
Pacific Islander	0.420 (1.108)	0.291 (1.105)	0.373 (1.107)
Industry Controls	yes	yes	yes
N	508	508	508
Log-likelihood	-483.130	-484.941	-483.648
$\chi^2_{(22)}$	40.330	38.927	40.543

Significance levels: * : 10% ** : 5% *** : 1%

*Table 6: Heterogeneity of the Human Capital Levels and
Results of Wilcoxon-Mann-Whitney Tests*

	Number	Observed Team	Randomly Composed Team	Wilcoxon-Mann-Whitney Test	
		Mean Std. Dev.	Mean Std. Dev.	z	P > z
Married Couple	254	0.03561	0.04997	6.080	0.0000***
Team of 2 w/o Married Couple	144	0.04408	0.06273	4.285	0.0000***
Team of 2	398	0.03840	0.05433	7.491	0.0000***
Team of 3	65	0.05848	0.08449	4.720	0.0000***
Team of 4	39	0.07685	0.08949	1.476	0.1401
Team of 5	6	0.06262	0.07348	1.029	0.3033

Significance levels: * : 10% ** : 5% *** : 1%

Table 7: OLS Regression with Robust Standard Errors
 Dependent Variable = Heterogeneity of the Human Capital Levels

Variables	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Spouse	0.010 (0.007)	0.001 (0.007)	0.006 (0.008)	-0.003 (0.008)
Partner	0.006 (0.009)	-0.003 (0.008)	0.003 (0.009)	-0.005 (0.009)
Relatives	0.040*** (0.007)	0.024*** (0.007)	0.041*** (0.007)	0.024*** (0.007)
Friends or Acquaintances	0.010* (0.007)	-0.005 (0.007)	0.008 (0.007)	-0.008 (0.007)
Team of 3		0.022*** (0.007)		0.022*** (0.007)
Team of 4		0.031*** (0.008)		0.032*** (0.008)
Team of 5		0.026** (0.010)		0.029** (0.010)
Women			0.006 (0.010)	0.003 (0.010)
Hispanic/Latino			-0.018** (0.009)	-0.021*** (0.008)
Black/African American			-0.018*** (0.005)	-0.019*** (0.006)
American Indians			-0.011 (0.010)	-0.005 (0.010)
Asian			-0.007 (0.017)	-0.008 (0.016)
Pacific Islander			-0.075*** (0.011)	-0.075*** (0.012)
Industry Controls	yes	yes	yes	yes
N	508	508	508	508
R ²	0.162	0.201	0.193	0.232
F (12,495)	4.776			
F (15,492)		5.976		
F (18,488)			6.009	
F (21,485)				7.196

Significance levels: * : 10% ** : 5% *** : 1%

CHAPTER 2

Entrepreneurial Team Composition: It's Not Just What You Know, but also How Long You've Known the Co-Founders!

2.1 Introduction

The successful creation of a new business is a challenging task that requires a wide range of knowledge and experience. Often, it is not accomplished by a solo entrepreneur, but by a team (Ruef, Aldrich, and Carter, 2003). Despite the fact that in practice other stakeholders increasingly pay attention to the characteristics of entrepreneurial teams (Franke, Gruber, Harhoff, and Henkel, 2006), little is known about those teams, or the skills and personal characteristics that their members bring to them - factors that link the founders to each other and eventually help a young firm to emerge.

In an interview during the 50th anniversary celebration of Hewlett-Packard on March 6, 1989, Bill Hewlett and Dave Packard provided some insights into their relationship and about the ingredients of their successful partnership:

Dave Packard: [...] Well, I think that the essence of this whole thing is Bill and I got to be very good friends when we started at Stanford back in 1930. We were both taking some of the same courses in engineering, and we found we both had an interest in fishing and outdoor sports. So we had developed a good friendship in the early years at Stanford. [...] We had a good close relationship from the very beginning, and I don't think we've ever had any major disagreements. [...] Oh, there were some things on which we didn't completely agree, but I think we certainly have respect for each other's ability and we were just very fortunate to have the good friendship that has prevailed over 50 years.

Bill Hewlett: We also had a common set of objectives. [...] We also were both technical people. We felt that we should use our technical skills to get where we wanted to be. So right there were the ideas of how we wanted to treat people, how we wanted to finance the company, and what products we wanted to get into.¹

Bill Hewlett and Dave Packard point to some characteristics that are widely overlooked in the existing literature on the foundation of businesses. The short narrative suggests focusing on entrepreneurial teams as a construct of collective actions, in which not only human capital but also personal traits and trust, among other things, might matter for a successful business foundation.

¹1989 HP Communications workshop features Q & A with co-founders available at: <http://www.hp.com/retiree/history/founders/bdinterview.html>, last accessed: 31.3.2010

To investigate this topic, we sought to gain a deeper understanding of the composition of start-up teams, and the factors that drive it. Using data from the Panel Study of Entrepreneurial Dynamics (PSED II), we provide evidence addressing the roles of the entrepreneurs' cognitive abilities and social and financial capital, as well as the characteristics of their interpersonal relationships, as a way of understanding why certain entrepreneurial teams emerge and jointly carry out the foundation process.

Our results indicate that the composition of entrepreneurial teams is driven by the need of the founders to overcome the limitations of their own human capital and fill resource gaps with resources provided by other people. We show that heterogeneity in human capital levels is mainly compensated for by high levels of social cohesion. Entrepreneurial teams are formed based on pre-existing interpersonal relationships that have been able to overcome a lack of human capital, and considerations such as trust and shared tacit understanding might be considered to be just as important as pure human capital considerations. Teams that share some common attributes are likely to exhibit greater trust and agreement on decision-making processes, and, accordingly, should be able to establish more effective communication and coordination routines. In addition, we show that social capital needs for the ventures are mainly satisfied by the founder who possesses the higher level of human capital. We conclude that human capital affects the level of social capital that founders can access, and that bringing in one's own contacts can strengthen the position of one founder vis-à-vis his fellow team members. This supports the contention that human capital has an impact on financial capital, and also argues that founders can strengthen their role within the venture through aligning managerial input with potential financial rewards and decision-making rights (Audretsch, Lehmann, and Plummer, 2009).

The article proceeds as follows. In Section Two we review the related literature and propose our hypotheses. In Section Three we present the dataset and methodology used. Section Four presents the results and Section Five concludes.

2.2 Theory and Hypotheses

The performance of individuals is strongly determined by their embedded human capital, which increases their cognitive abilities and leads to more productive and efficient activities (Mincer, 1958; Schultz, 1959; Becker, 1964). If profitable opportunities for entrepreneurial activities exist, individuals with higher levels of human capital should be better at perceiving them. Once engaged in the entrepreneurial process, such nascent entrepreneurs should also have superior abilities to successfully exploit these opportunities (Davidsson and Honig, 2003; Bosma, van Praag, Thurik, and de Wit, 2004; Rauch, Frese, and Utsch, 2005).

Lazear (2004) points out that an entrepreneur must exhibit “jack-of-all-trade” characteristics and is mainly limited by his or her weakest skill. Extending this logic from the individual to the team, people should decide to become entrepreneurs if one team member can compensate for a potential skill limitation of another team member. For example, a highly skilled scientist with limited managerial experience might benefit from adding a person with greater management experience to the team to successfully navigate the venture through the founding process. Analyzing the situation purely in terms of resources, nascent entrepreneurial teams should be formed by people who best complement each other’s skill sets and compensate for each other’s weaknesses.

There are limitations on who the founders can profitably select to round out the team. It might not be a good idea for a highly skilled manager to join a mediocre scientist in founding a new venture. The levels of education and functional experience should match each other; in labor-market equilibrium, nascent entrepreneurial teams will consist of business partners having similar levels of human capital (Fabel, 2004), though the human capital in question might come from different sources, including education and work experience.

2.2.1 *Financial and Human Capital*

Empirical research indicates that inadequate capitalization of young firms is one of the key reasons for subsequent business failure (Bosma, van Praag, Thurik, and de Wit, 2004). Start-ups lack access to formal capital markets, and thus are forced to rely on informal networks of family or friends to finance their fledgling businesses

(Myers and Majluf, 1984). Clearly, finding suitable sources of financing is one of the most critical tasks for young entrepreneurs.

Evans and Jovanovic (1989) propose the notion of liquidity constraints on new ventures. Substantial capital is required to bring new ventures to life. If the personal financial resources of the founders are inadequate for launching the firm, loans provide an alternative way to obtain financing. However, actually receiving these external financial resources might prove difficult for founders. Given the high-risk profile of young start-ups, the borrowing costs might turn out to be prohibitively expensive. To overcome this hurdle, nascent entrepreneurs often rely on personal or family wealth, either to finance their firms directly or to serve as collateral for loans (Holtz-Eakin, Joulfaian, and Rosen, 1994).

Accordingly, bootstrapping financial resources to overcome capital needs to start a business is an essential part of the founding process. Chandler and Hanks (1998) analyze the financing sources of small and medium sized companies and find evidence for a substitution effect between financial and human capital. To overcome a lack of sufficient financing sources, founders are able to rely on co-founders to inject capital, despite a lower level of human capital that the co-founders might bring to the venture. We formulate the following hypothesis:

***Hypothesis 1a:** When entrepreneurial teams are being formed, financial and human capital can substitute for one another.*

Another central theme in entrepreneurial team composition concerns the distribution of power and control. Zingales (2000) argues that individuals bring important resources to the firm, and consequently derive power from it. Maintaining or enhancing one's personal power when managing a venture jointly becomes an issue when all parties bring in different levels of intangible human capital. Each party is naturally prone to agency risk when each has to exert effort to ensure future value creation that will be shared jointly among the team members. Each can decide whether to further put his or her personal resources to productive use or withhold them from other team members.

According to Zingales (2000) and Rajan and Zingales (2001), systems of governance should be designed so that decision-making rights are allocated to the individuals who are best at pursuing opportunities. Hence, founding team members with a higher level of human capital should receive higher equity stakes to retain decision-making control over the new venture. If team members are crucial for the firm's success, they will naturally require a higher claim on the future profits as compensation for their effort.

Audretsch, Lehmann, and Plummer (2009) contend that ownership of equity and ownership of knowledge should be complements in a strategic entrepreneurship context. Accordingly, a founder receives compensation based on the firm's performance and the value of the firm after an investment is made. When important co-founders are given partial ownership of the firm, they can be motivated through future claims on company profits. In sum, the joint production of knowledge will become more fruitful for all parties involved when each has an incentive to specialize and is later rewarded. However, if a founder does not participate in increasing the value of the firm relative to the importance of his human capital, this might stifle the provision of future effort. Any misalignment of incentives might thus be detrimental for future firm performance.

Thus, critical resources that determine competitive advantages are created out of embedded human capital, and safeguarded through incentive alignment among team members through equity ownership. This leads to the alternative hypothesis:

***Hypothesis 1b:** When entrepreneurial teams are being formed, financial and human capital complement each other.*

2.2.2 Social and Human Capital

Nascent entrepreneurs are likely to lack some resources that are needed to fully administer all relevant and critical tasks in new business foundation, which makes them prone to liabilities of newness (Stinchcombe, 1965; Pfeffer and Salancik, 1978). Therefore, in addition to their own human capital, entrepreneurs must rely on external resources and capabilities. Social capital grants people access to resources in a wider context (Burt, 1992). Moreover, personal ties and social interactions can

help to acquire organizational legitimacy, to create customer acceptance, and to facilitate access to external resources (Liao and Welsch, 2005). Relational resources might therefore explain why some entrepreneurial firms prosper despite a lack of internal resources (Yli-Renko, Autio, and Sapienza, 2001). Competitive advantages of firms therefore not only arise because of firm-level resources, but also because they are embedded in dyadic and network relationships (Dyer and Singh, 1998).

According to Cope, Jack, and Rose (2007), social capital applies to external networks that might help the founders to coordinate the foundation process more effectively through external help. Ties a team member possesses can bring access to external resources and/or information critical for the success of the venture (Davidsson and Honig, 2003). The social networks that team members are embedded in might be an important feature they could bring to the new venture, like their human capital (Bourdieu, 1983).

Because the co-founders' individual networks can translate into webs of relationships that might benefit the firm (Anderson, Park, and Jack, 2007), founders can rely on co-founders with a higher level of social capital, despite the fact that they have a lower level of human capital, to help grow the venture. These elucidations lead to the following hypothesis:

***Hypothesis 2a:** When entrepreneurial teams are being formed, social and human capital can substitute for one another.*

However, Coleman (1988) argues that human and social capital may also act as complements. Social capital within both the family and the immediate community promotes the formation of human capital. In an entrepreneurial context, Anderson and Miller (2003) conclude that entrepreneurs from higher socio-economic groups have higher amounts of human capital, and additional access to social networks that are similarly characterized by higher amounts of human capital. Consequently, co-founders with greater human capital may bring into the start-up more valuable external resources and/or information which are critical for the success of the venture, and they can influence future value generation not only through their

own human capital but also through their social contacts. Thus, founders who possess higher levels of human capital should have greater incentives to bring in their own set of contacts to the venture. And indeed they tend to do this, because their human capital yields even higher profits when it is complemented by highly effective social capital. Hence, entrepreneurs could control intangible resources through social contacts that complement their own skill sets. Accessing such a network of complimentary and auxiliary resources should strengthen the importance of a founding team member. Thus, we formulate the following alternative hypothesis:

***Hypothesis 2b:** When entrepreneurial teams are being formed, social and human capital complement each other.*

2.2.3 Social Cohesion and Human Capital

According to Forbes, Borchert, Zellmer-Bruhn, and Sapienza (2006), entrepreneurial team compositions are driven by rational motives based on economic considerations, and, in addition, by interpersonal attraction. While heterogeneity in functional and educational backgrounds might bring about several benefits in terms of combining resources, the disadvantages are fairly obvious. Despite being equipped with complimentary resources, team members might be different in terms of personal characteristics that do not fall under the categories of human or social capital. Bearing in mind that the pursuit of entrepreneurial opportunities in uncertain and ambiguous environments involves substantial managerial discretion in decision-making, the social dimension in entrepreneurial team formation might play a tremendous role in making the difference between those who succeed and those who go under.

Lechler (2001) shows how well-balanced teams might be better able to overcome organizational dysfunctions of team building efforts such as social loafing, risk- and blame-shifting, and groupthink. He documents the important role that social interaction among team members plays in financial success. Empirical evidence shows that teams that work well together can make faster decisions and act more flexibly, and are more productive (Smith, Smith, Olian, Sims, O'Bannon, and Scully, 1994). Moreover, there might be an inherent desire by entrepreneurs

to duplicate their own qualities. Neiswander, Bird, and Young (1987) find that entrepreneurs with a technical background hire family or friends with technical backgrounds as initial employees.

Clearly, the work atmosphere can be more important than the additional skills a partner might bring in. In family-founded businesses, the notions of homophily and trust are the most prominent drivers of team composition (Ruef, Aldrich, and Carter, 2003). Chemistry might surpass pure resource motives behind team formation processes; the resource-based view might have less influence than affective and interpersonal characteristics (Ensley, Pearson, and Amason, 2002). A shared, unspoken understanding of the issues at hand can speed up the decision-making process among team members, and in a work environment where co-workers know each other well, less effort may be required to maintain interpersonal relationships. Teams that share some common attributes are likely to exhibit greater trust and agreement on decision-making processes, and, accordingly, should be able to establish more effective communication and coordination routines (Smith, Smith, Olian, Sims, O'Bannon, and Scully, 1994; Amason and Sapienza, 1997; Certo, Lester, Dalton, and Dalton, 2006). We therefore formulate the following hypothesis:

***Hypothesis 3:** When entrepreneurial teams are being formed, social cohesion and human capital can substitute for one another.*

2.3 Methodology

2.3.1 Dataset

To test our hypotheses empirically, we draw on the Second Panel Study of Entrepreneurial Dynamics (PSED II) dataset. The PSED II is a representative survey of entrepreneurial activities in the United States that portrays individuals during their business creation processes. The dataset describes the characteristics of nascent entrepreneurs, documents the sequences of the organizing activities, summarizes the types and volumes of resources committed, and characterizes the new ventures.² Given the difficulty of disentangling the contribution of human,

²Detailed descriptions of the methods and sampling used to generate PSED II can be found in Gartner, Shaver, Carter, and Reynolds (2004).

financial and social capital within the team, we dropped the groups with three and more members from our analysis.

2.3.2 Measures

Dependent Variable

The most widely-cited components of human capital that may provide useful knowledge to nascent entrepreneurial teams are formal education (e.g., Evans and Leighton, 1989; Dickson, Solomon, and Weaver, 2008), labor market experience (e.g., Bosma, van Praag, Thurik, and de Wit, 2004), and entrepreneurial experience (e.g., Robinson and Sexton, 1994; Bosma, van Praag, Thurik, and de Wit, 2004).³

Formal education is variously assumed to increase cognitive abilities and to enhance the probability of perceiving and exploiting profitable entrepreneurial opportunities. The findings of many empirical studies suggest a significant positive relationship between formal education and several entrepreneurial success measures (e.g., Dickson, Solomon, and Weaver, 2008). In the PSED II dataset, respondents were asked to indicate the highest level of education each member of the entrepreneurial team had completed.⁴ This variable, ranging from elementary school to PhD, has been, for operational reasons, recoded into number of years of education, as in Davidsson and Honig (2003).⁵

To measure labor market experience with the PSED II dataset, an index is constructed using general labor force experience measured as years of full-time paid

³According to the meta-analytical review of Unger, Rauch, Frese, and Rosenbusch, 2009, the most frequently employed indicators of human capital were education (used 69 times), start-up/owner experience (31 times), industry specific experience (22 times), management experience (21 times), and work experience (12 times).

⁴Question AH6 in the PSED II dataset: What is the highest level of education you have / NAME has completed?

⁵We recoded the variable so that: "1. Up to eighth grade" equals 8 years of education, "2. Some high school" equals 10 years of education, "3. High school degree" equals 12 years of education, "4. Technical or vocational degree" equals 14 years of education, "5. Some college" equals 14 years of education, "6. Community college degree" equals 14 years of education, "7. Bachelor's degree" equals 16 years of education, "8. Some graduate training" equals 17 years of education, "9. Master's degree" equals 17.5 years of education, and "10. Law, MD, PhD, EDD degree" equals 19 years of education.

work experience⁶, managerial experience determined by years of managerial, supervisory, or administrative responsibilities⁷, and work experience in the relevant industry quantified by years of work experience in the industry in which the new venture is active⁸.

Prior entrepreneurial experience can be expected to facilitate the development of the organizational routines and skills in which new ventures are initially disadvantaged (Delmar and Shane, 2006). In the PSED II data set, two indicators for prior entrepreneurial experience can be distinguished: the number of other businesses an individual previously helped to start as an owner⁹, and the number of other businesses an individual currently owns¹⁰. Utilizing these two indicators, an index of entrepreneurial experience is constructed.

To develop one overall measure of human capital for each nascent entrepreneurial team member, we calculate a human capital index that includes the relevant sub-indices of formal education, labor market experience, and entrepreneurial experience. In constructing this human capital index, each of the indicators of human capital is mapped onto a scale of zero to one, where 0 is the minimum and 1 the maximum value for a specific indicator.¹¹

For calculating the industry-specific weights for the sub-indices and for the overall human capital index, we apply principal component analysis. The central idea of this analysis is to reduce the dimensionality of the interrelated indicators used, while retaining as much as possible of the variance in the resulting principal components, so that the weights used for calculating the sub-indices and the overall human capital index capture the variation as fully as possible.¹²

⁶Question AH20 in the PSED II dataset: How many years of full time, paid work experience have you / has NAME had?

⁷Question AH21 in the PSED II dataset: For how many years, if any, have / has you / NAME had managerial, supervisory, or administrative responsibilities?

⁸Question AH11 in the PSED II dataset: How many years of work experience have you / has NAME had in the industry where this new business will compete?

⁹Question AH12 in the PSED II dataset: How many other businesses have you / has NAME helped to start as an owner or part-owner?

¹⁰Question AH13 in the PSED II dataset: Besides the new business discussed in this interview, how many other businesses do you / does NAME own?

¹¹The variables are transformed employing the formula $(X_i - X_{min}) / (X_{max} - X_{min})$

¹²The resulting industry-specific weights for the sub-indices and the overall human capital index are presented in the appendix.

Table 1 shows the summary statistics for the human capital index. According to this index, the industry in which nascent entrepreneurial teams have the highest average level of human capital is the high-tech communications industry. This result is driven by an above-average level of formal education, labor market experience, and entrepreneurial experience. Other sectors with high human capital levels include industries like financial & insurance activities and manufacturing, mining & utilities. Labor market experience is remarkably high in manufacturing, mining & utilities. The industry with the lowest level of human capital is retail, restaurant, wholesale distribution & transportation. Nascent entrepreneurial teams in this industry have especially low entrepreneurial experience.

[Insert Table 1 about here]

In our subsequent analysis we use this human capital index to calculate the heterogeneity of the human capital levels of nascent entrepreneurial teams. As a measure of heterogeneity, we calculate the differences between the individual human capital levels of the nascent entrepreneurial team members.

Explanatory Variables

To test the hypotheses presented in Section Two, we constructed three variables addressing financial capital, social capital, and social cohesion.

Financial Capital

In addition to human capital, nascent entrepreneurial team members may also provide financial capital to the new venture, either to purchase ownership, or in the form of a loan that eventually must be repaid. We calculate two financial capital variables from the PSED II dataset: the difference in equity capital and the difference in debt capital.¹³ Each variable is constructed by subtracting the

¹³Question AQ12 in the PSED II dataset: Based on what you just said, the total amount you have / NAME has contributed to this new business (before it was registered as [C1]), either to purchase ownership or as a loan to this new business, is approximately [SUM Q4-Q10] dollars. Is this correct? Question AQ13 in the PSED II dataset: How much of the [SUM Q4-Q10] dollars that you / NAME contributed is considered a loan to the new business that must be paid back to you / NAME?

invested capital from team member 2 from the capital invested by team member 1, leading to a variable with the potential values [<0 ; 0; >0].

Social Capital

In the PSED II dataset, respondents were asked whether they provided introductions to other people.¹⁴ The social capital variable is therefore constructed by subtracting team member 2's answer from team member 1's answer, leading to a variable with the potential values [+1; 0; -1]. If team member 1 has brought in people who assist the founders but team member 2 has not, the value is [+1], and if the reverse is true, [-1]. If both team members either have or have not provided such contacts, the value is [0].

Social Cohesion

According to Mullen and Cooper (1994), cohesion among team members is determined by interpersonal attraction, group pride and commitment to the team. We cannot test for these factors directly, but instead employ a variable measuring the duration of social interactions among the team members involved.

Empirical work shows that the length of time the people have known each other is strongly related to cohesiveness in teams, and affects team performance positively (Eisenhardt and Schoonhoven, 1990; Smith, Smith, Olian, Sims, O'Bannon, and Scully, 1994; Ensley, Pearson, and Amason, 2002). Hence, we include the years of interpersonal relationships among entrepreneurial team members into our analysis to proxy for an inherent understanding of each other's skills, attitudes and likely personal friendship.¹⁵

Control Variables

In order to control for effects that might otherwise influence the regressions, we control for the industry and the relationship between the entrepreneurial team members.

¹⁴Question AH23 in the PSED II dataset: In addition to time and personal investments of money, in what other ways have you / has NAME helped with this new business? First, have you / has NAME provided introductions to other people?

¹⁵Question AH7 in the PSED II dataset: How many years have you known NAME?

One can argue that the contribution of human capital to the probability of bringing the start-up process to a successful completion differs across industries. Investments in human capital might be particularly relevant in knowledge-intensive industries, whereas the effect of the human capital levels in other industries might be less significant. Therefore, industry is included in the regressions as a set of eight dummy variables, with customer, consumer & business consulting or services as the reference group.¹⁶

The relationship between team members is operationalized as spouses, partners, relatives, friends or acquaintances, and strangers before joining the nascent entrepreneurial team, and is included as a set of four dummy variables, with strangers before joining the nascent entrepreneurial team as the reference group.¹⁷

2.3.3 Empirical Methodology

To test the hypotheses, we estimate OLS regressions with robust standard errors using the explanatory variables described above. Additionally, we include dummies for the industry and the relationship between the entrepreneurial team members. The relation dummies are measured against team members being strangers before joining the nascent entrepreneurial team. Concerning the reference industry, we omitted customer, consumer & business consulting or services to avoid perfect collinearity.

2.4 Results

Table 2 displays means, standard deviations, and correlation coefficients for both the independent and dependent variables. With respect to the difference in human capital levels of 0.249, one can conclude that nascent entrepreneurial teams of two people have an average human capital heterogeneity of 0.249. The difference in

¹⁶Question AB1 in the PSED II dataset: Which of the following best describes this new business - would you say it is a retail store, a restaurant, tavern, bar, or nightclub, customer or consumer service, health, education or social service, manufacturing, construction, agriculture, mining, wholesale distribution, transportation, utilities, communications, finance, insurance, real estate, some type of business consulting or service, or something else?

¹⁷Question AH8 in the PSED II dataset: How would you describe your relationship with NAME – are you spouses, partners sharing a household, relatives living in the same household, relatives living in different households, friends or acquaintances from work, friends or acquaintances you have not worked with, strangers before joining the new business team, or do you have some other type of relationship?

social capital of 0.043 indicates that there are only minor differences between the entrepreneurial team members in social relationships to external people. A mean value of 18.878 for social cohesion shows that the team members have known each other on average for almost 19 years. And the values for equity and debt capital reveal that one team member provides on average about 6300 dollars more equity capital and 5500 dollars more debt capital than the other. The correlations across all explanatory variables are fairly low; thus, multicollinearity does not appear to be a problem.

[Insert Table 2 about here]

Table 3 presents the regression results. They reveal a positive and highly significant effect of the differences in financial capital provided on the differences in human capital. This implies that individuals of greater ability also provide more equity and debt to the venture. There is no substitution between financial and human capital, but rather, they act as complements, thus supporting Hypothesis 1b.

Moreover, the difference in social capital exhibits a positive and statistically highly significant impact (at the 1% level in both regression specifications) on the difference in human capital, supporting Hypothesis 2b. Nascent entrepreneurs with high levels of social capital have a high average level of human capital too.

Lastly, with respect to social cohesion, we find a positive and significant relation (at the 5% and 10% level). This supports Hypothesis 3, that social cohesion among nascent entrepreneurial team members can substitute for missing human capital.

[Insert Table 3 about here]

Examining the control variables, we see that the difference in human capital within nascent entrepreneurial teams is not affected by the industry. However, the homogeneity of human capital is affected negatively if relatives or friends are involved in the new venture, further strengthening the results on social cohesion.

Hence, entrepreneurs choose a shared and tacit understanding of issues at hand with relatives and friends over getting access to similar levels of human capital that non-familiar co-founders might bring in.

2.5 Conclusion

In this paper we analyze the forces that drive the composition of entrepreneurial teams. We find that founders need to involve partners in order to overcome limitations in human capital and fill resource gaps. Where there is heterogeneity in human capital levels, it is accompanied by high levels of social cohesion, the founders having substituted pre-existing interpersonal relationships for pure human capital. Trust and shared tacit understanding can enable teams that share some common attributes to be able to establish more effective communication and coordination routines.

We show that social capital needs for the ventures are largely satisfied by the founder who exhibits a higher level of human capital. Human and social capital cannot substitute for one another. Co-founders with higher levels of human capital bring in more valuable external resources which might be critical for the success of the venture. Accordingly, they can influence future surplus generation not only through their own human capital but also through complementary social contacts that they bring to the venture.

Individuals of higher ability also provide larger amounts of financial capital. This underscores the impact of human capital on the financial capital that is available, and also shows that founders can strengthen their role within the venture by aligning managerial inputs with potential financial rewards and decision making rights. Hence, we find that the provision of equity is linked to a member's human capital.

Our study is not without limitations. First, our research was limited to teams that did not have long histories of operating functionally in the market and therefore had not been tested in ways that might challenge their cohesiveness. It might be interesting to extend our analysis to focus on the decisions to hire key employees, and to test whether similar patterns of social cohesion and human capital will be found as teams evolve over time and different skills become critical to sustain

competitiveness. Moreover, analyzing the monetary compensation of new key employees could further test our argument regarding incentive alignment within entrepreneurial teams, where human capital and financial capital act as complements. Second, we did not test how the documented team composition actually affects the way teams carry out the founding process. In future studies, our results could provide a basis for a better understanding of entrepreneurial emergence and the paths that entrepreneurs follow. The combinations of skills and resources that entrepreneurs bring to the venture must shape the way they carry out their organizing activities. Social cohesion should allow entrepreneurial teams to better split workloads and fulfill tasks simultaneously, thereby avoiding costly monitoring of fellow co-founders. And better incentive alignment among founders, and clear hierarchies that reflect the importance of each team member for the process, must facilitate the allocation and fulfillment of tasks.

In conclusion, we believe that our results provide important insights into the team formation process of nascent entrepreneurial ventures. We pointed out some previously-overlooked criteria that shape the composition of entrepreneurial ventures and are likely to determine why some firms prosper and other fail to stand the test of time. Founders must choose their team carefully when founding a company. Aligning incentives intelligently proves worthwhile as it avoids future tension when founders are compensated for the effort they have invested. Getting things right from the start must therefore be of tremendous importance when making the transition from concept to company.

References of Chapter 2

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2.A Appendix

Weights of the Human Capital Index

	Formal Education
Agriculture	25.55%
Communications	47.82%
Construction	30.99%
Cust., Cons. & Bus. Cons. or Serv.	32.91%
Financial & Insurance Activities	17.52%
Health, Education or Social Services	29.28%
Manufacturing, Mining & Utilities	30.17%
Real Estate	24.44%
Retail, Rest., Wholes. Dist. & Trans.	23.48%

	Labor Market Experience	Years of Work Exp. in the Relevant Industry	Years of Full-Time Paid Work Experience	Years of Manag., Superv., or Admin. Responsibilities
Agriculture	38.84%	26.06%	37.20%	36.74%
Communications	44.22%	31.08%	34.50%	34.42%
Construction	32.86%	28.47%	35.52%	36.01%
Cust., Cons. & Bus. Cons. or Serv.	35.59%	25.98%	37.54%	36.48%
Financial & Insurance Activities	40.29%	30.31%	34.19%	35.50%
Health, Education or Social Services	38.91%	29.25%	36.01%	34.74%
Manufacturing, Mining & Utilities	33.91%	22.19%	40.16%	37.65%
Real Estate	36.95%	28.29%	35.27%	36.44%
Retail, Rest., Wholes. Dist. & Trans.	39.06%	29.51%	34.69%	35.80%

	Entrepreneurial Experience	Number of Other Businesses Helped to Start as an Owner	Number of Other Businesses be Owned
Agriculture	35.61%	50.00%	50.00%
Communications	7.96%	50.00%	50.00%
Construction	36.15%	50.00%	50.00%
Cust., Cons. & Bus. Cons. or Serv.	31.50%	50.00%	50.00%
Financial & Insurance Activities	42.19%	50.00%	50.00%
Health, Education or Social Services	31.81%	50.00%	50.00%
Manufacturing, Mining & Utilities	35.92%	50.00%	50.00%
Real Estate	38.61%	50.00%	50.00%
Retail, Rest., Wholes. Dist. & Trans.	37.46%	50.00%	50.00%

Table 1: Summary Statistics of the Sub-Indices and the Human Capital Index

	N	Formal Education		Labor Market Experience		Entrepreneurial Experience		Human Capital Index		
		Mean	Mean	Mean	Mean	Mean	Std. Dev.	Min.	Max.	
Agriculture	24	0.566	0.255	0.107	0.294	0.082	0.104	0.423		
Communications	7	0.583	0.342	0.155	0.393	0.151	0.076	0.518		
Construction	26	0.505	0.201	0.084	0.268	0.091	0.086	0.537		
Cost., Cons. & Bus. Cons. or Serv.	142	0.584	0.216	0.045	0.293	0.091	0.097	0.589		
Financial & Insurance Activities	7	0.762	0.291	0.173	0.350	0.137	0.169	0.587		
Health, Education or Social Services	21	0.600	0.259	0.047	0.303	0.095	0.187	0.560		
Manufacturing, Mining & Utilities	25	0.502	0.360	0.119	0.342	0.116	0.128	0.551		
Real Estate	17	0.603	0.218	0.067	0.274	0.105	0.112	0.527		
Retail, Rest., Wholes. Dist. & Trans.	95	0.547	0.248	0.041	0.267	0.101	0.047	0.585		
Total	364	0.567	0.242	0.061	0.290	0.100	0.047	0.589		

Table 2: Descriptive Statistics and Correlation Matrix

Variables	1	2	3	4	5	6	7	8		
(1) Difference in Human Capital	1.000									
(2) Difference in Social Capital	0.249	1.000								
(3) Social Cohesion	0.043	0.333	1.000							
(4) Difference in Equity Capital (in '000)	18.878	14.412	0.126	1.000						
(5) Difference in Debt Capital (in '000)	6.310	38.957	0.084	0.041	1.000					
(6) Agriculture	5.479	57.918	0.053	0.010	-0.030	1.000				
(7) Communications	0.065	0.248	-0.016	-0.002	0.217	0.066	1.000			
(8) Construction	0.018	0.132	0.035	0.100	0.093	0.017	0.005	1.000		
(9) Financial & Insurance Activities	0.071	0.256	-0.023	-0.099	-0.051	-0.066	-0.019	-0.073	1.000	
(10) Health, Education or Social Services	0.018	0.132	-0.011	-0.054	0.006	-0.013	-0.035	-0.018	-0.037	
(11) Manufacturing, Mining & Utilities	0.055	0.229	0.041	0.086	-0.080	-0.051	-0.016	-0.064	-0.032	-0.067
(12) Real Estate	0.068	0.252	-0.029	0.036	0.106	-0.007	-0.023	-0.072	-0.036	-0.074
(13) Retail, Restaurant, Wholesale Distribution & Transportation	0.045	0.208	-0.074	0.029	-0.064	0.085	0.201	-0.058	-0.029	-0.060
(14) Spouses	0.264	0.442	0.077	-0.005	-0.061	0.027	-0.032	-0.159	-0.080	-0.165
(15) Partners	0.592	0.492	0.072	0.059	0.090	0.007	-0.058	0.054	-0.045	-0.011
(16) Relatives	0.078	0.269	-0.002	-0.024	-0.191	-0.017	-0.015	0.037	-0.039	-0.007
(17) Friends	0.131	0.338	0.002	-0.047	0.314	0.046	0.035	0.018	0.061	0.068
	0.224	0.418	-0.106	0.002	-0.215	-0.043	0.046	-0.093	0.020	-0.007
Variables	9	10	11	12	13	14	15	16	17	
(9) Financial & Insurance Activities	1.000									
(10) Health, Education or Social Services	-0.032	1.000								
(11) Manufacturing, Mining & Utilities	-0.036	-0.065	1.000							
(12) Real Estate	-0.029	-0.053	-0.059	1.000						
(13) Retail, Restaurant, Wholesale Distribution & Transportation	-0.080	-0.145	-0.162	-0.131	1.000					
(14) Spouses	-0.006	0.089	0.041	-0.090	-0.002	1.000				
(15) Partners	-0.039	-0.070	-0.041	-0.018	0.060	-0.351	1.000			
(16) Relatives	0.005	-0.094	-0.016	0.023	-0.047	-0.437	-0.113	1.000		
(17) Friends	0.020	0.028	0.047	0.144	-0.035	-0.574	-0.134	-0.155	1.000	

Table 3: OLS Regression with Robust Standard Errors
Dependent Variable = Difference in Human Capital

Variables	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Difference in Equity Capital (in '000)	0.001** (0.001)			0.001** (0.001)
Difference in Debt Capital (in '000)	0.001*** (0.000)			0.001*** (0.000)
Difference in Social Capital		0.350*** (0.051)		0.359*** (0.051)
Social Cohesion			0.005* (0.002)	0.006** (0.003)
Agriculture	-0.096 (0.126)	0.012 (0.094)	-0.009 (0.117)	-0.036 (0.097)
Communications	0.144 (0.116)	0.007 (0.082)	0.129 (0.127)	-0.049 (0.099)
Construction	-0.017 (0.115)	0.038 (0.107)	0.001 (0.115)	0.076 (0.107)
Financial & Insurance Activities	-0.022 (0.177)	-0.013 (0.176)	0.021 (0.177)	0.021 (0.181)
Health, Education or Social Services	0.115 (0.138)	0.038 (0.121)	0.138 (0.141)	0.070 (0.123)
Manufacturing, Mining & Utilities	-0.023 (0.122)	-0.010 (0.121)	-0.031 (0.121)	-0.023 (0.121)
Real Estate	-0.161 (0.152)	-0.149 (0.142)	-0.086 (0.149)	-0.167 (0.144)
Retail, Restaurant, Wholesale Distribution & Transportation	0.068 (0.067)	0.077 (0.065)	0.088 (0.067)	0.077 (0.065)
Spouses	0.000 (0.088)	-0.084 (0.085)	-0.042 (0.085)	-0.105 (0.083)
Partners	-0.023 (0.116)	-0.118 (0.112)	-0.025 (0.112)	-0.079 (0.108)
Relatives	-0.030 (0.096)	-0.065 (0.088)	-0.102 (0.101)	-0.157* (0.094)
Friends	-0.125 (0.091)	-0.194** (0.084)	-0.142 (0.087)	-0.177** (0.079)
N	364	364	364	364
F _(14,349)	2.93			
F _(13,350)		5.59	1.74	
F _(16,347)				6.92
R ²	0.04	0.13	0.04	0.16

Significance levels: * : 10% ** : 5% *** : 1%

CHAPTER 3

Understanding the Dynamics of Nascent Entrepreneurship: Is It What You Know, or What You Do, or Both?

3.1 Introduction

Various studies analyze the relationship between human capital and different entrepreneurial success measures (e.g., Sexton and Bowman, 1985; Cooper, Gimeno-Gascon, and Woo, 1994; Chandler and Hanks, 1998; Davidsson and Honig, 2003; Bosma, van Praag, Thurik, and de Wit, 2004; Rauch, Frese, and Utsch, 2005). They argue that human capital increases the capabilities of entrepreneurs to discover and exploit business opportunities. Moreover, they claim that human capital helps entrepreneurs to acquire other urgently-needed resources such as financial and physical capital, and it assists in the accumulation of new knowledge and skills (Unger, Rauch, Frese, and Rosenbusch, 2009). All of these analyzes trace the success of entrepreneurial venture creation back to the entrepreneur's human capital. The process by which new ventures are brought to life, however, remains unconsidered.

A second stream of the literature focuses on the process of new venture creation and aims at finding critical activities that either help or hinder the likelihood of successful venture emergence. Most evidence concerns legitimizing activities such as business planning and incorporation, and their impact on venture emergence (Delmar and Shane, 2004). Recently, Lichtenstein, Carter, Dooley, and Gartner (2007) use the process of organizing entrepreneurial activities by itself to explain why some ventures emerge and others fail to stand the test of time. They find that certain procedural characteristics - rate, concentration, and timing of concentration - heavily influence the ability of nascent entrepreneurs to successfully bring their efforts to fruition. However, the characteristics of the entrepreneurs' human capital underlying the process of creating a new business are not discussed.

If skills, resources and capabilities of the nascent entrepreneurs affect the structuring and timely implementation of strategic actions (Penrose, 1959; Barney, 1991) and if studying the process of founding a new venture yields insights into the probability of new venture emergence, then it should be worthwhile to investigate the impact of human capital on the design of the gestation process - and, in consequence, on the likelihood of successful new venture creation. Separating procedural elements from the underlying entrepreneurial human capital might not be helpful in illuminating why firms emerge and what actually happens on the path to new venture emergence.

To help close this research gap, our empirical study explores the design of the founding process of new ventures with different human capital factors, and, more importantly, we use measures for the gestation process conjointly with the human capital of the entrepreneur as variables to deepen the understanding of venture emergence. In doing so, we use the Second Panel Study of Entrepreneurial Dynamics (PSED II). This dataset is a representative portrait of entrepreneurial activities in the United States that identifies individuals during their business creation process. It provides information on the characteristics of the nascent entrepreneurs and their potential new businesses, along with details of their start-up activities, including the sequence of organizing activities and the types and volumes of resources committed.

To examine these issues, the remainder of this article is structured as follows: Section Two outlines the theoretical background and derives the hypotheses. Section Three describes the dataset used in the empirical analysis and presents the methodology. Section Four presents the results. And Section Five discusses the findings and concludes.

3.2 Theory and Hypotheses

3.2.1 *Concept of Human Capital*

Mincer (1958), Schultz (1959), and Becker (1964) initially developed human capital theory to systematically analyze income inequalities among employees. In doing so, they related the distribution of income to the distribution of individual skills. The literature of entrepreneurship has adopted their argumentation to solve the puzzle of entrepreneurial success (Sexton and Bowman, 1985; Cooper, Gimeno-Gascon, and Woo, 1994; Chandler and Hanks, 1998; Davidsson and Honig, 2003; Bosma, van Praag, Thurik, and de Wit, 2004; Rauch, Frese, and Utsch, 2005). Researchers argue the cognitive abilities of entrepreneurs depend on their human capital. Therefore, if profitable opportunities for entrepreneurial activities exist, individuals with higher levels of human capital should outperform others in perceiving them, and building organizations around them to actually reap the benefits from their exerted effort (Gartner, 1985; Haber and Reichel, 2007). To do this, they have to structure a complex set of interrelated tasks. They have to

decide based on their own judgment which activities to start with and how to pursue the subsequent steps. While engaged in these organizing activities, nascent entrepreneurs are plagued by high levels of uncertainty and ambiguity. Substantial discretion in entrepreneurial decisions is necessary to take the appropriate organizing actions and to bring entrepreneurial efforts to fruition in the future. Hence, the probability of successful venture creation can be traced back to the human capital of the entrepreneur.

3.2.2 *Gestation Process of New Ventures*

Studies on the process and sequence of events that determine venture emergence go back to the early work of Gartner (1985), who outlined a framework of four dimensions (individuals, activities, organizational structure, and environment) that shape the path to emergence. Against this background, Katz and Gartner (1988) describe the process of organizational emergence according to four specific categories (intentionality, assembly of resources, development of an organizational boundary, and exchange of resources across the boundary) in which organizational activities can be grouped. In addition, Bhave (1994) presents a theoretical model for organizational emergence that involves three discrete phases that built upon each other. Building on these theoretical frameworks there is widespread empirical support for the existence of critical activities that either help or hinder the likelihood of successful venture emergence (Delmar and Shane, 2004; Brush, Manolova, and Edelman, 2008). However, the sequence of events and the underlying structure remains largely unclear. Forcing the organizing activities in specific, pre-defined categories might omit an inherent structure and consequentially potential interdependencies are empirically difficult to disentangle. For example, certain elements of intentionality, such as writing business plans or filling financial reports, might be inherently linked with other elements of the process, such as hiring employees, contacting potential customers or developing prototypes (Brush, Manolova, and Edelman, 2008).

A number of studies has subsequently adopted a more dynamic view of venture emergence and partially models the emerging patterns. Tornikoski and Newbert (2007) emphasize the active search for legitimacy as the key to understanding

firm emergence. Part of the activities studied affects legitimization positively and hence, fosters emergence. Thus, by focusing on the temporal inter-linkages among activities they find evidence for procedural elements that are linearly linked to each other. In a related study, Haber and Reichel (2007) test a model of venture emergence where the sequence of start-up activities is temporally cumulative. But in contrast, other studies document that the organizing process is unlikely to be linear or cumulative, but might rather be “simultaneous, messy and iterative” (Brush, Manolova, and Edelman, 2008) or “chaotic” with interdependent characteristics (Carter, Gartner, and Reynolds, 1996; Bygrave, 1989).

To better cope with the underlying procedural dynamics, Lichtenstein, Carter, Dooley, and Gartner (2007) focus on three complexity measures (rate, concentration and timing) to describe the entrepreneurial gestation process. Their analysis focuses on a non-linear and interdependent framework. They find that the speed of carrying out organizing activities (rate), the extent to which these activities are spread out systematically (concentration), and the performance of the activities in later stages of the founding process (timing) all have a positive impact on the likelihood of new venture emergence. Hence, they argue that the design of the entrepreneurial process solely influences the probability of successful venture creation.

3.2.3 *Towards a Synthesis of Human Capital and Procedural Elements*

The studies undertaken suffer from mainly two problems that make it difficult to understand the root causes for venture emergence, either a lack of structural dependence or an omission of antecedents to procedural elements. If human capital affects the structuring of the organizing activities, and thus the design of the entrepreneurial process, and if studying the process of founding new ventures yields insights into the likelihood of their emergence, then it should be worthwhile to relate the founders’ human capital with the design of the gestation process - and, in consequence, with the probability of success. Separating procedural elements from the underlying entrepreneurial human capital might be of little help in shedding light on why some firms emerge and what actually happens on the path to entrepreneurial success.

Consequently, combining different human capital factors of nascent entrepreneurs with measures that describe the design of the entrepreneurial gestation process can help to understand how human capital affect the gestation processes, and, more importantly, how the measures taken within the gestation processes conjointly with the human capital factors affect the chances of new venture emergence. In doing so, we focus on the complexity measures suggested in Lichtenstein, Carter, Dooley, and Gartner (2007) (rate, concentration, and timing) as they allow for interdependencies and non-linearity when studying the patterns of organizing activities.¹ Figure 1 summarizes the arguments.

[Insert Figure 1 about here]

Human Capital, Rate, and the Probability of Venture Emergence

Founding a new business involves a complex set of interrelated organizing activities. The ability to successfully execute such complex activities when exploiting entrepreneurial opportunities critically depends on the entrepreneur's human capital. Since human capital increases cognitive abilities (Mincer, 1958; Schultz, 1959; Becker, 1964), nascent entrepreneurs with higher levels of human capital should accomplish the gestation process more productively and efficiently (Davidsson and Honig, 2003); if profitable opportunities for entrepreneurial activities are recognized, individuals with higher levels of human capital should fulfill the relevant organizing activities in a shorter time period. Based on this argumentation, we formulate the following hypothesis:

Hypothesis 1a: *A higher level of human capital of nascent entrepreneurs leads to a higher rate of organizing activities.*

One of the key stumbling blocks of young start-ups is acquiring legitimacy from external stakeholders, such as outside financiers and customers (Aldrich,

¹We deviate in our framework by introducing interdependencies among the procedural characteristics. In fact, by sequencing certain organizing tasks, all three of the measures could be affected. Therefore, by simply focusing on a single complexity measure in isolation to describe the likelihood of new firm creation and neglecting interdependencies among the three complexity measures could distort the empirical estimates. We elaborate on this in more detail in the Section "Control Variables".

1999). Shane and Delmar (2004) analyzed the timing of activities and found that firms that concentrate on legitimizing activities have higher chances of survival. The viability of the venture can be established when activities are carried out quickly to ensure legitimacy to stakeholders. Accordingly, carrying out organizing activities faster should help ventures to stand the test of time. That leads to the following hypothesis:

***Hypothesis 1b:** (All else constant) A higher rate of organizing activities increases the chances of venture emergence.*

Human Capital, Concentration, and the Probability of Venture Emergence

Pre-existing knowledge derived from formal education, previous work experience or entrepreneurial activity empowers nascent entrepreneurs to organize the process more systematically (Unger, Rauch, Frese, and Rosenbusch, 2009). Knowing what to expect and what the process requirements are significantly reduces ambiguity in task selection and enhances the allocation of time and effort. Nascent entrepreneurs with a higher level of human capital have more insights as to how the founding process might evolve. Thus, they can anticipate future contingencies, react in a timely fashion as well as with adequate effort, and therefore roll out activities more systematically over time. These arguments lead to the following hypothesis:

***Hypothesis 2a:** A higher level of human capital of nascent entrepreneurs leads to a lower concentration of organizing activities.*

According to Gartner, Shaver, Carter, and Reynolds (2004), each of the intermediate activities during the founding process has to be mastered in order to successfully found a new business. Consequently, time and effort have to be split among the tasks involved. A fairly high concentration of activities (doing a large number of things at the same time) implies a lack of time and effort to be devoted to each task. Hence, the performance might suffer. We formulate the following

hypothesis:

***Hypothesis 2b:** (All else constant) A lower concentration of organizing activities increases the chances of venture emergence.*

Human Capital, Timing, and the Probability of Venture Emergence

Concerning the distribution of tasks over time, Tornikoski and Newbert (2007) argue that entrepreneurial organizing activities are temporally linked. Acquiring strategic legitimacy, creating the impression of a credible organization, helps to carry out further start-up activities such as attracting customers, recruit employees, or gain access to other critical resources. In this respect, organizing nascent entrepreneurial activities means navigating through a virtual tree diagram of options, in which choices made earlier determine which choices can be made later. The management of these options rests heavily on entrepreneurial discretion that will be enabled or constrained by the human capital of the nascent entrepreneurs. Different entrepreneurs may face similar (or even identical) opportunities, but due to heterogeneity in their human resources, their organizing patterns differ (Bowman and Hurry, 1993; Baker and Nelson, 2005). Thus, nascent entrepreneurs with higher levels of human capital should be better in recognizing, managing, and exercising their strategic options, and simply have more options available in the future due to better option management in the early days of venture development. As a result, later timing of entrepreneurial activities reflects the fact that entrepreneurs economize on early efforts and harvest real options when starting the venture. Therefore, we formulate the following hypothesis:

***Hypothesis 3a:** A higher level of human capital of nascent entrepreneurs leads to a higher concentration of organizing activities at later stages.*

Since organizing nascent entrepreneurial activities involves making decisions, and the earlier ones act as pre-requisites for the later ones, then early efforts (which may actually not yield immediate results) enable entrepreneurs to recognize and exercise future complementary real options (Bowman and Hurry, 1993). For

example, early stage R&D efforts are an investment that creates future options to patent, manufacture, market, and eventually sell. Hence, future complementary real options can only be executed because of previous exercised options. In this respect, an increasing momentum within the founding process should lead to higher chances of successful venture emergence. This argumentation leads to the following hypothesis:

***Hypothesis 3b:** (All else constant) A higher concentration of organizing activities at later stages increases the chances of venture emergence.*

3.3 Methodology

3.3.1 Dataset

To test our hypotheses empirically, we draw on the Second Panel Study of Entrepreneurial Dynamics (PSED II) dataset. The PSED II is a representative survey of entrepreneurial activities in the United States that identifies individuals during their business creation process. The dataset provides information on the characteristics of the nascent entrepreneur and their potential new businesses, documents the sequences of the organizing activities, summarizes the types and volumes of resources committed, and characterizes the new ventures.²

3.3.2 Measures

Dependent Variables

According to Lichtenstein, Carter, Dooley, and Gartner (2007), the design of the venture creation process can be quantified using three complexity measures: rate, concentration and timing. These three dimensions comprehensively explore the temporal dynamics of the organizing activities of nascent entrepreneurs. We build upon this work in our study and relate three factors of human capital (formal education, labor market experience, and entrepreneurial experience) to the process characteristics in the empirical section.

²Detailed descriptions of the methods and sampling used to generate PSED II can be found in Gartner, Shaver, Carter, and Reynolds (2004).

The PSED II dataset lists 33 typical organizing start-up activities of nascent entrepreneurs as well as the respective dates when the activities took place.³ Each activity can be traced back to a specific month.⁴ Hence, the dataset fully depicts the sequence of organizing activities.⁵ The starting date of the sequence corresponds to the point in time when the nascent entrepreneur first thought of starting this new business.⁶ The final point is defined as the date when the nascent entrepreneur either gave up⁷, or achieved positive cash flow for the first time⁸ (Gartner, Shaver, Carter, and Reynolds, 2004). Thus, we define the relevant duration of the gestation process as the time span between the point when the nascent entrepreneurs first thought of starting this new business, and when the effort succeeded or was abandoned. The process can then be described by the order of activities and the length of time elapsing between all activities.

Rate

Rate is defined as the total number of start-up activities undertaken by the particular nascent entrepreneur divided by the duration (in months) of the gestation process of this new business. For example, a nascent entrepreneur may have undertaken the organizing activities in months 1, 5, 5, 6, 7, 8, 10, a total of 7 activities within a time span of 10 months, resulting in a rate of 0.7. Accordingly, rate measures the average pace of organizing activities across the gestation process.

³A catalog with all the organizing start-up activities is presented in the appendix.

⁴Some interviewees could not remember the exact month in which the organizing activity was undertaken. Then the time frames of spring, summer, fall, and winter were used. We then recoded the seasons so that spring equals May, summer equals August, fall equals November, and winter equals February.

⁵Following Lichtenstein, Carter, Dooley, and Gartner (2007), we excluded from our analysis any start-up activities that took place either before the first-thought-of date or after the start / quit date. This is done to exclude situations in which someone was trying to start a different kind of entrepreneurial effort rather than enacting this specific business idea.

⁶Question AA8a/b in the PSED II dataset: In what month and year did you first think about starting this new business?

⁷Question BA43a/b and CA43a/b in the PSED II dataset: In what month and year did you end your active role in working on this business start-up?

⁸Question A35 in the PSED II dataset: What was the first month and year in which monthly revenue was greater than all monthly expenses, including salaries for the owners active in managing the business?

Concentration

Concentration quantifies how closely the entrepreneurial activities are accomplished in relationship to other start-up activities. A high concentration would mean that many of the organizing activities are bunched together. Thus, as in Lichtenstein, Carter, Dooley, and Gartner (2007), concentration is operationalized in terms of the variance of monthly activity times multiplied by negative 1 and divided by 1000. For example, a nascent entrepreneur has undertaken all the organizing activities within one month, resulting in a variance of 0. If the organizing activities are more dispersed - such as 1, 5, 5, 6, 7, 8, 10 - the variance would be -0.008. Concentration thus decreases with larger variance of activities, i.e., if start-up activities are more dispersed.

Timing

Timing is measured by the average event time divided by the duration of the gestation process. Thus, it quantifies whether the bulk of the organizing activities is accomplished earlier or later during the start-up process. For example, the average event time associated with the organizing activities 1, 5, 5, 6, 7, 8, 10 is 6, divided by a duration of 10 months, results in a timing of 0.6. A timing value close to 0 means that most of the start-up activities occurred in the first month of the gestation process; however, if most of the organizing activities occurred at the end of the gestation process, timing approaches 1.

Our calculations of rate, concentration, and timing follow the methodological approach of Lichtenstein, Carter, Dooley, and Gartner (2007). However, we use the more current dataset of PSED II.

Completion of Entrepreneurial Organizing Activities

Researchers have discussed a wide variety of measures to determine the point at which a nascent venture finishes its entrepreneurial organizing activities and becomes an operational business: ability to raise external money, legal establishment of the new venture, first sales, positive cash flow, reaching the break-even point, etc. (Gartner and Carter, 2003). Bygrave (1989) asserts that the only way to

know whether the new venture will do steady business is to see if it generates a positive cash flow.⁹ Positive cash flows are also used in the PSED II as a criterion for identifying an operating business (Gartner, Shaver, Carter, and Reynolds, 2004). According to this argumentation, the completion of the entrepreneurial organizing activities is indicated in our study by new ventures reaching a positive monthly cash flow for the first time. In the PSED II data set, respondents were asked whether monthly revenues had ever exceeded monthly expenses for their new venture, i.e., whether their new business had ever had a positive monthly cash flow from operations.¹⁰

Explanatory Variables

Following Becker (1964), we define human capital as skills and knowledge that individuals acquire through schooling, on-the-job training, and other types of experience. To test the hypotheses laid out in Section Two, we operationalize human capital using the most widely-cited factors in the entrepreneurship literature: formal education (e.g., Evans and Leighton, 1989; Dickson, Solomon, and Weaver, 2008), labor market experience (e.g., Bosma, van Praag, Thurik, and de Wit, 2004), and entrepreneurial experience (e.g., Robinson and Sexton, 1994; Bosma, van Praag, Thurik, and de Wit, 2004).¹¹

Formal Education

In the PSED II dataset, respondents were asked to indicate the highest level of education all members of the entrepreneurial team had completed.¹² This variable, ranging from elementary school to PhD, was for operational reasons recoded into

⁹Other researchers claim that cash flow has limitations as a measure of the completion of the entrepreneurial organizing activities. Bhidé (2000) argues that cash flow is not likely to be an early goal of most high-potential new ventures. Katz and Cabezuelo (2004) make the case that nascent entrepreneurs are not always sophisticated enough to calculate positive cash flows exactly.

¹⁰Question A35 in the PSED II dataset: What was the first month and year in which monthly revenue was greater than all monthly expenses, including salaries for the owners active in managing the business?

¹¹According to the meta-analytical review of Unger, Rauch, Frese, and Rosenbusch, 2009, the most frequently employed indicators of human capital were education (used 69 times), start-up/owner experience (31 times), industry specific experience (22 times), management experience (21 times), and work experience (12 times).

¹²Question AH6 in the PSED II dataset: What is the highest level of education you have / NAME has completed?

number of years of education, as in Davidsson and Honig (2003).¹³

Labor Market Experience

We construct an index of labor market experience, using years of work experience in the industry in which the new venture is active¹⁴, years of full-time paid work experience¹⁵, and years of managerial, supervisory, and/or administrative responsibilities of the nascent entrepreneurs¹⁶.

Entrepreneurial Experience

We further create an index of entrepreneurial experience, utilizing the number of other businesses the respondent or the co-founders previously helped to start as an owner¹⁷, and the number of other businesses they currently own¹⁸.

In constructing these indices, each of the five relevant indicators of human capital is mapped onto a scale of zero to one.¹⁹ To calculate the industry-specific weights for the indices, we then apply principal component analysis. The central idea of this analysis is to reduce the dimensionality of the interrelated indicators while retaining as much as possible of the variance in the resulting principal components. Consequently, the resulting statistics are comparable across the different dimensions.²⁰

¹³We recoded the variable so that: "1. Up to eighth grade" equals 8 years of education, "2. Some high school" equals 10 years of education, "3. High school degree" equals 12 years of education, "4. Technical or vocational degree" equals 14 years of education, "5. Some college" equals 14 years of education, "6. Community college degree" equals 14 years of education, "7. Bachelor's degree" equals 16 years of education, "8. Some graduate training" equals 17 years of education, "9. Master's degree" equals 17.5 years of education, and "10. Law, MD, PhD, EDD degree" equals 19 years of education.

¹⁴Question AH11 in the PSED II dataset: How many years of work experience have you / has NAME had in the industry where this new business will compete?

¹⁵Question AH20 in the PSED II dataset: How many years of full time, paid work experience have you / has NAME had?

¹⁶Question AH21 in the PSED II dataset: For how many years, if any, have / has you / NAME had managerial, supervisory, or administrative responsibilities?

¹⁷Question AH12 in the PSED II dataset: How many other businesses have you / has NAME helped to start as an owner or part-owner?

¹⁸Question AH13 in the PSED II dataset: Besides the new business discussed in this interview, how many other businesses do you / does NAME own?

¹⁹The variables are transformed employing the formula $(X_i - X_{min}) / (X_{max} - X_{min})$.

²⁰The calculation methodology and the resulting industry-specific weights for the two indices are presented in the appendix.

The three factors of human capital are calculated for solo entrepreneurs and team foundations. To draw inferences on the gestation process from the entire distribution of human capital within the founding teams, we incorporate the average levels of the factors of human capital into our empirical analysis. Table 1 reports the summary statistics for the human capital measures. According to this table, the sector in which nascent entrepreneurial teams have on average the highest level of human capital is the high-tech communications industry. This result is driven by an above-average level of labor market experience and entrepreneurial experience. Other sectors having a high human capital level include financial & insurance activities, manufacturing, mining & utilities, and real estate. Labor market experience is extremely high in manufacturing, mining & utilities. The sector with the lowest level of human capital is retail, restaurant, wholesale distribution & transportation. Nascent entrepreneurial teams in these industries have especially low entrepreneurial experience.

[Insert Table 1 about here]

Control Variables

In order to control for effects that might otherwise influence the regressions, we control for a wide variety of variables.

In the PSED II dataset, respondents were asked whether there are legal entity owners representing a government agency, a venture capital firm, a bank, or some other type of institution supporting the gestation of the new business. Accordingly, we tie the help provided by external partners to some vested financial interest in the venture. Hence, the dummy variable *sponsors* takes on the value of one if there has been any outside help provided by one of the agencies and zero otherwise.²¹

In addition to support in the form of financial interest through the aforementioned legal entities, we also include key people who offer support without a corresponding ownership stake in the company. These partners may provide advice, training, physical resources, business services, personal services, etc., to the nascent

²¹Question AK4 in the PSED II dataset: Does the institution NAME represent a bank, a venture capital firm, a government agency, or some other type of institution?

entrepreneurs, but are not members of the founding team itself. The dummy variable supporters is constructed from the two categories key non-owners²² and helpers²³ from the PSED II dataset, with nascent ventures without any supporters as the reference group.

The business creation process might differ between high-tech and low-tech ventures. Therefore, we include a dummy variable with low-tech as the reference category.²⁴

Due to the fact that not all nascent entrepreneurs dedicate the same amount of time to the new business, the gestation process of a new venture could be different. Hence, we control for the total hours devoted to the new business.²⁵

The literature argues that unemployment reduces the opportunity costs of self-employment because of a lack of income, and hence pushes people to undertake entrepreneurial activities (Evans and Leighton, 1990; Storey, 1991; Meager, 1992). This different motivation to start a new business could result in a differently shaped gestation process. For this reason, we account for unemployment with a dummy variable.²⁶

The organizational lineage of the entrepreneurs involved might affect the shape of the business creation process (Klepper, 2001; Hsu, 2004). Either inherited (through existing contacts within the previous work environment) or recently created (through a newly established business affiliation) informal advice networks could provide additional help in facilitating the founding process. In order to account for this effect, we include the source of the business idea into the regressions to proxy for unobserved inherited organizational routines or advice networks in our analysis. The locus of opportunity recognition is included as a dummy variable, with business idea emerged from a non-work related activity as the reference group.²⁷

²²Question AG13 in the PSED II dataset: How many additional people, who will not have an ownership share, have made a distinctive contribution to the founding of this new business?

²³Question AG18 in the PSED II dataset: How many other people, who will not have an ownership share, have provided significant support, advice, or guidance on a regular basis to this new business?

²⁴Question AS6 in the PSED II dataset: Would you consider this new business to be high-tech?

²⁵Question AH14 in the PSED II dataset: How many hours in total have you / has NAME devoted to this new business?

²⁶Question AX5 in the PSED II dataset: Are you unemployed?

²⁷Question AA9 in the PSED II dataset: Did this new business emerge from your current work activity, from previous work activity, from a separate business you own and manage, from a hobby

Team size is operationalized as the number of owners, and is included as a set of three dummy variables, with a team size of two as the reference group. Inclusion of team size dummies is indicated in the corresponding table. To preserve lucidity, coefficients are not tabulated.

Since the influence of human capital on the design of the gestation process could differ across industries (i.e., some industries may be more human capital intensive), we include eight industry dummies. We omit the industry customer, consumer & business consulting, or services as the reference group in each regression to avoid perfect collinearity.²⁸ Inclusion of industry dummies is indicated in the corresponding table. To preserve lucidity, coefficients are not tabulated.

In their regressions, Lichtenstein, Carter, Dooley, and Gartner (2007) focus on each of the three complexity measures (rate, concentration and timing) separately while predicting the emergence of new firms. But there could be correlation among the three different complexity measures. By shifting a single activity to a later point in time, an entrepreneur not only impacts the timing of activities, but also the concentration. In fact, any time tasks are sequenced, all three measures are affected. So focusing on a single complexity measure to describe the likelihood of new firm creation, and neglecting interdependencies among the three complexity measures, could distort the empirical estimates. In contrast to Lichtenstein, Carter, Dooley, and Gartner (2007), we therefore estimate three first-stage regressions, with the complexity measures of rate, concentration, and timing as the dependent variables, and the three factors of human capital and all of the control variables as explanatory variables. Thereafter, we insert the remaining residuals of the first-stage regressions for rate, concentration, and timing as control variables into the second stage regressions to obtain the pure effect of the human capital factors on the gestation process and on the probability of new firm creation.

or recreational pastime, from academic, scientific, or applied research, or was it from an idea you or another member of the start-up team had?

²⁸Question AB1 in the PSED II dataset: Which of the following best describes this new business - would you say it is a retail store, a restaurant, tavern, bar, or nightclub, customer or consumer service, health, education or social service, manufacturing, construction, agriculture, mining, wholesale distribution, transportation, utilities, communications, finance, insurance, real estate, some type of business consulting or service, or something else?

3.3.3 Empirical Methodology

The empirical part of this paper uses two different regression techniques for testing the aforementioned hypotheses: OLS regression models and multivariate logistic regression models.

We estimate OLS regression models with robust standard errors for testing the influence of the three factors of human capital on the variables describing the gestation process of a new venture - rate, concentration, and timing.

As the completion of entrepreneurial organizing activities is measured on a binary scale, we use multivariate logistic regression models with robust standard errors for testing the influence of both the design of the founding process and the human capital of the nascent entrepreneurs on the completion of the gestation process.

3.4 Results

Table 2 displays means, standard deviations, and correlation coefficients for both the independent and dependent variables. With respect to the rate of start-up activities of 0.015 activities/day or about 0.45 activities/month, one can conclude that on average a nascent entrepreneur accomplishes one start-up activity roughly every two months. The concentration mean of 346 indicates that start-up activities are spread out over time.²⁹ The average timing of these activities across all start-ups is 0.299, indicating that most of the start-up activities take place earlier in the gestation process.³⁰ The correlations across all explanatory variables are fairly low; thus, multicollinearity does not appear to be a problem.

[Insert Table 2 about here]

Table 3 presents the regression results regarding the dependent variable rate. With respect to Hypothesis 1a, the results provide highly significant evidence

²⁹If the organizing activities of a new venture are accomplished within one month, the variance is zero; this represents maximum concentration.

³⁰A timing close to 0 implies that most of the organizing activities occurred at the beginning of the gestation process, whereas a timing close to 1 denotes that most of the start-up activities took place at the end of the gestation process.

that a higher level of human capital causes a higher rate of organizing activities. In particular, high task-related knowledge such as entrepreneurial and labor market experience increases the rate of organizing activities, whereas low task-related knowledge such as formal education shows no statistically significant effects. Knowing the process requirements, based on insights from previous entrepreneurial experience, significantly reduces ambiguity and enables people to select the correct tasks at the correct time. Therefore, time and effort are devoted to the different organizing activities more appropriately than would otherwise be possible, and the necessary steps of the gestation process are done faster. In addition, the regression results reveal that the positive effects of high task-related knowledge decrease with increasing entrepreneurial and labor market experience.

[Insert Table 3 about here]

With respect to the distribution of organizing activities over time, we find that formal education significantly decreases the concentration of organizing events. In contrast, high task-related knowledge does not have any effect on the concentration of organizing events. Nascent entrepreneurs with higher levels of formal education spread out the entrepreneurial tasks more evenly over time, causing a lower concentration of the organizing activities. Hence, there is significant evidence supporting Hypothesis 2a, that a higher level of human capital leads to a lower concentration of organizing activities.

[Insert Table 4 about here]

Table 5 documents the driving patterns of the complexity measure timing for the entrepreneurial founding process. Entrepreneurial experience exhibits a positive and statistically significant impact on the timing of organizing activities, supporting our argumentation in Hypothesis 3a. Entrepreneurs with high levels of previous entrepreneurial experience are able to concentrate their activities at a later stage in time. More experienced entrepreneurs are better able to create,

manage, and harvest their strategic options, and are therefore able to build on early efforts. Hence, they have higher chances of successfully founding a new business. Among the different kinds of human capital, previous entrepreneurial experience appears to yield the most valuable insights on timing; none of the other variables is significant at conventional levels.

[Insert Table 5 about here]

Reviewing the endogeneity-adjusted complexity measures residual rate, residual concentration, and residual timing of concentration, we can infer that concentration has a highly significant negative impact, and timing a highly significant positive impact, on the rate of organizing activities. With respect to concentration, we observe that rate has a negative impact, while timing impacts concentration positively. Both variables are significant at the 1% level. With respect to the timing of the concentration of the organizing activities, the results indicate a highly significant, positive relationship with rate. The results also indicate a highly significant, positive relationship between timing of the concentration of the organizing activities and concentration. Thus, the complexity measures appear to be highly interrelated. However, even when controlling for this effect, we can confirm that the human capital of nascent entrepreneurs impacts the foundation process. Given the consideration of disturbances through correlations among the complexity measures, the two-step framework provides robust estimates and an undistorted analysis of the human capital factors shaping the design of nascent entrepreneurial dynamics.

Concerning the control variables, we find that the coefficient associated with sponsors is positive and significant at the 10% level, with timing of concentration as the dependent variable. The dummy for supporters is, however, not significant in any regression. Accordingly, involving partners with a vested financial interest (sponsors) allows nascent entrepreneurs to organize the bulk of activities in later stages. Among the control variable high-tech, we find that there is a lower concentration and a later timing of concentration of the organizing activities in high-tech ventures. The coefficient associated with the number of total devoted hours is positive and significant at least at the 10% level on concentration, indicating that

those nascent entrepreneurs who spend more time working on their venture are not able to spread their activities more evenly. Additionally, nascent entrepreneurs who were previously unemployed spread out their activities more evenly when founding a new business. Nascent entrepreneurs who follow a work-related business idea also spread out their activities more evenly, and, in addition, accelerate the foundation process and time the organizing activities later. Hence, there is evidence that entrepreneurs who focus on business ideas that are close to their previous work can use their acquired (and therefore likely more task-related) human capital to speed up the process and organize it more effectively.

Finally, Table 6 provides the logit regression, testing the links between successful venture creation, the three factors of human capital, and the three complexity measures. Concerning Hypotheses 1b and 3b, we find strong support that rate and timing of concentration increases the chances of venture emergence. Regarding Hypothesis 2b, the concentration of organizing activities has no statistically significant effect on the likelihood of new venture emergence in terms of achieving a positive cash flow. Reviewing the control variables, we find that the probability of completing the founding process successfully is significantly higher if there is a work-related business idea.

[Insert Table 6 about here]

3.5 Conclusion

The results suggest that entrepreneurial and labor market experience allow nascent entrepreneurs to carry out the organizing activities faster. Moreover, individuals who have been entrepreneurs in the past are able to time their activities later. Formal education affects the distribution of tasks over time: a solid understanding of the process requirements helps nascent entrepreneurs who have a high level of formal education to carry out their organizing activities more evenly. In sum, we find strong evidence that human capital shapes the way entrepreneurs carry out their organizing activities.

Additionally, we show that a higher rate and a later timing of the organizing activities enhance the probability of successful venture creation, whereas the concentration of organizing activities has no statistically significant effect on the likelihood of new venture emergence. Against this background, our findings show that human capital is most important for the probability of new venture emergence - both directly and indirectly via the founding process - if it consists of high task-related knowledge such as entrepreneurial or labor market experience. But human capital has neither a direct nor indirect effect on the likelihood of successful venture creation when it consists of low task-related knowledge such as formal education.

These empirical findings are strong enough to yield some practical implications. On the one hand, to become successful in founding a new venture, nascent entrepreneurs should first invest in the acquisition of task-related knowledge. Furthermore, if they are looking for co-founders, they should evaluate them exclusively on their entrepreneurial and labor market experience, not on their formal education. Similarly, in their evaluation of nascent entrepreneurs, decision makers like founding consultants and venture capitalists should focus solely on high task-related knowledge, but not on low task-related knowledge, i.e., formal education.

Our study is not without limitations: While we focus on disentangling the relationship between different measures of human capital and the impact of process characteristics on gestation outcomes, we did not fit these combined measures into the wider environmental context. Future studies could address these shortcomings and situate the relationship of human capital and entrepreneurial activities into the wider social context. Addressing contingencies, such as the role of socially supportive or performance based cultures on entrepreneurial outcomes might enhance our understanding of human capital and the linkages with procedural characteristics even further (Shane and Venkataraman, 2000; Stephan and Uhlaner, 2010; Levie and Autio, 2008). Such efforts might help to identify relationships that are even stronger than the ones reported in this study or uncover factors that might mediate the effect of human capital on the process of organizing activities.

Our work constitutes a small step towards a better understanding of the entrepreneurial foundation processes. Yet we hope that our insights provide a solid basis for future research into this area. Specifically, the interplay of success factors

over time has not been studied systematically. To fully understand the interactions and trade-offs between the processes and the underlying entrepreneurial characteristics, one would have to disentangle the time-dependent, non-linear process dynamics and interactions among the complexity measures.

References of Chapter 3

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3.A Appendix

Organizing Start-Up Activities Listed in PSED II

Wave A	Wave B	Wave C	Question
	BA11a/b	CA11a/b	In what month and year was the name registered with the appropriate government agency?
AB9a/b	BB9a/b	CB9a/b	In what month and year was any physical space first used for the new business?
AC3a/b	BC3a/b	CC3a/b	In what month and year has the legal form been formally established by registering with the appropriate government agency?
AC5a/b	BC5a/b	CC5a/b	In what month and year was liability insurance for this new business first purchased?
AD3a/b	BD3a/b	CD3a/b	In what month and year did you start preparing the business plan?
AD4a/b	BD4a/b	CD4a/b	In what month and year was the first version of the business plan completed?
AD8a/b	BD8a/b	CD8a/b	In what month and year was the product or service completed and ready for sale?
AD10a/b	BD10a/b	CD10a/b	In what month and year did marketing or promotional efforts begin?
AD12a/b	BD12a/b	CD12a/b	In what month and year was the proprietary technology or process developed for this new business?
AD14a/b	BD14a/b	CD14a/b	In what month and year did preparation begin for an application of a patent, copyright, or trademark?
AD15a/b	BD15a/b	CD15a/b	In what month and year was a patent, copyright, or trademark granted?
AD17a/b	BD17a/b	CD17a/b	In what month and year have any major items like equipment, facilities, or property been purchased, leased or rented specifically for this new business?
AD19a/b	BD19a/b	CD19a/b	In what month and year have purchases been made of any raw materials, inventory, supplies, or components specifically for this new business?
AD21a/b	BD21a/b	CD21a/b	In what month and year has an effort been made to talk with potential customers about the product or service of this new business?
AD23a/b	BD23a/b	CD23a/b	In what month and year has an effort been made to collect information about the competitors of this new business?
AD27a/b	BD27a/b	CD27a/b	In what month and year have any financial projections, such as income or cash flow statements or break-even analysis, been developed?
AD29a/b	BD29a/b	CD29a/b	In what month and year were the regulatory requirements for this new business determined?
AE2a/b	BE2a/b	CE2a/b	In what month and year did you first seek outside funding for this new business?
AE4a/b	BE4a/b	CE4a/b	In what month and year did the first outside funding begin for this new business?
AE6a/b	BE6a/b	CE6a/b	In what month and year was supplier credit first established?
AE8a/b	BE8a/b	CE8a/b	In what month and year was the first person hired for this new business?
AE12a/b	BE12a/b	CE12a/b	In what month and year was the first exclusive account opened for this new business?
AE19a/b	BE19a/b	CAE19a/b	In what month and year was an accountant retained for this new business?
AE21a/b	BE21a/b	CE21a/b	In what month and year was a lawyer retained for this new business?
AE23a/b	BE23a/b	CE23a/b	In what month and year did the new business first become a member of a trade or industry association?
AE25a/b	BE25a/b	CE25a/b	In what month and year did this new business first get a listing in the phone book, a business e-mail, or website?
AE27a/b	BE27a/b	CE27a/b	In what month and year was the application for a Federal EIN made?
AE29a/b	BE29a/b	CE29a/b	In what month and year was the application for a "doing business as" name filed?
AE31a/b	BE31a/b	CE31a/b	In what month and year was the first state unemployment insurance payment made for this new business?
AE33a/b	BE33a/b	CE33a/b	In what month and year was the first federal social security payment made for this new business?
AE35a/b	BE35a/b	CE35a/b	In what month and year was the first federal income tax return filed for this new business?
AE37a/b	BE37a/b	CE37a/b	In what month and year was this new business first listed in Dun and Bradstreet?
AR2a/b	BR2a/b	CR2a/b	In what month and year has this new business directly received any loans or financial support, including any loans or investments from you (or other owners)?

Principal Component Analysis

To develop a single measure of labor market experience and entrepreneurial experience, we calculate two indices: a labor market experience index and an entrepreneurial experience index. In constructing these two indices, each of the indicators is transformed on a scale of zero to one, where 0 is the minimum and 1 the maximum value for a specific indicator.³¹

For calculating the industry-specific weights for the two indices of human capital, we apply principal component analysis. Following Jolliffe (1986), we suppose that x is a vector of p random variables and Σ is the known covariance matrix. The first step in the principal component analysis is to look for a linear function $\alpha_1'x$ of the elements of x which has maximum variance:

$$\max \sigma^2(\alpha_1'x) = \max \alpha_1'\alpha_1\sigma^2(x) = \max \alpha_1'\Sigma\alpha_1$$

It is obvious that a constraint for α_1 must be imposed. The most convenient constraint is $\alpha_1'\alpha_1 = 1$. To maximize $\alpha_1'\Sigma\alpha_1$ subject to $\alpha_1'\alpha_1 = 1$, we use the technique of Lagrange multipliers and maximize:

$$\max L = \alpha_1'\Sigma\alpha_1 - \lambda(\alpha_1'\alpha_1 - 1)$$

Differentiation with respect to α_1 gives:

$$\Sigma\alpha_1 - \lambda\alpha_1 = 0$$

or

$$(\Sigma - \lambda I_p)\alpha_1 = 0$$

where I_p is the ($p \times p$) identity matrix. Thus, λ is an eigenvalue of Σ and α_1 is the corresponding eigenvector.

Remember, the equation to be maximized is:

$$\max \sigma^2(\alpha_1'x) = \max \alpha_1'\Sigma\alpha_1 = \max \alpha_1'\lambda\alpha_1 = \max \lambda\alpha_1'\alpha_1 = \max \lambda$$

So, the eigenvalue λ of Σ must be as large as possible. Thus, α_1 is the eigenvector corresponding to the largest eigenvalue λ of Σ . And therefore, the weights

³¹The variables are transformed employing the formula $(X_i - X_{min})/(X_{max} - X_{min})$.

w_m used for calculating the labor market experience index and the entrepreneurial experience index are:

$$w_m = \frac{\alpha_{1m}}{\sum_{i=1}^p \alpha_{1i}}$$

These weights w_m capture the variation as fully as possible.

Weights of the Human Capital Index

	Formal Education
Agriculture	25.55%
Communications	47.82%
Construction	30.99%
Cust., Cons. & Bus. Cons. or Serv.	32.91%
Financial & Insurance Activities	17.52%
Health, Education or Social Services	29.28%
Manufacturing, Mining & Utilities	30.17%
Real Estate	24.44%
Retail, Rest., Wholes. Dist. & Trans.	23.48%

	Labor Market Experience	Years of Work Exp. in the Relevant Industry	Years of Full-Time Paid Work Experience	Years of Manag., Superv., or Admin. Responsibilities
Agriculture	38.84%	26.06%	37.20%	36.74%
Communications	44.22%	31.08%	34.50%	34.42%
Construction	32.86%	28.47%	35.52%	36.01%
Cust., Cons. & Bus. Cons. or Serv.	35.59%	25.98%	37.54%	36.48%
Financial & Insurance Activities	40.29%	30.31%	34.19%	35.50%
Health, Education or Social Services	38.91%	29.25%	36.01%	34.74%
Manufacturing, Mining & Utilities	33.91%	22.19%	40.16%	37.65%
Real Estate	36.95%	28.29%	35.27%	36.44%
Retail, Rest., Wholes. Dist. & Trans.	39.06%	29.51%	34.69%	35.80%

	Entrepreneurial Experience	Number of Other Businesses Helped to Start as an Owner	Number of Other Businesses be Owned
Agriculture	35.61%	50.00%	50.00%
Communications	7.96%	50.00%	50.00%
Construction	36.15%	50.00%	50.00%
Cust., Cons. & Bus. Cons. or Serv.	31.50%	50.00%	50.00%
Financial & Insurance Activities	42.19%	50.00%	50.00%
Health, Education or Social Services	31.81%	50.00%	50.00%
Manufacturing, Mining & Utilities	35.92%	50.00%	50.00%
Real Estate	38.61%	50.00%	50.00%
Retail, Rest., Wholes. Dist. & Trans.	37.46%	50.00%	50.00%

Figure 1: Theoretical Model of the Tested Hypotheses

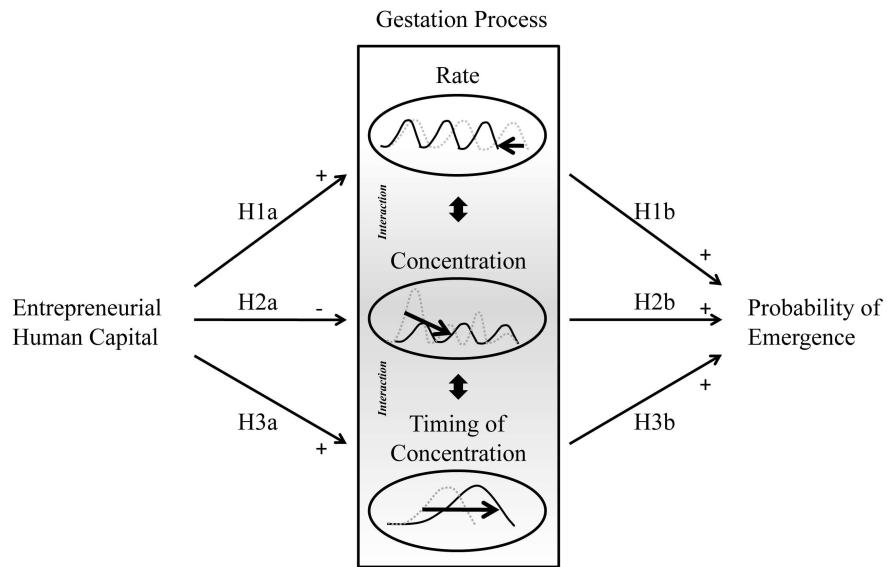


Table 1: Summary Statistics of the Human Capital Indices

	N	Formal Education			
		Mean	Std. Dev.	Min.	Max.
Agriculture	44	0.488	0.264	0.000	1.000
Communications	24	0.451	0.338	0.000	1.000
Construction	76	0.450	0.235	0.000	1.000
Cost., Cons. & Bus. Cons. or Serv.	447	0.523	0.245	0.000	1.000
Financial & Insurance Activities	17	0.488	0.351	0.000	1.000
Health, Education or Social Service	70	0.492	0.299	0.000	1.000
Manufacturing, Mining & Utilities	61	0.433	0.249	0.000	1.000
Real Estate	55	0.464	0.213	0.000	0.833
Retail, Rest., Wholes. Dist. & Trans.	203	0.464	0.243	0.000	1.000
Total	998	0.490	0.253	0.000	1.000

	N	Labor Market Experience			
		Mean	Std. Dev.	Min.	Max.
Agriculture	44	0.264	0.187	0.000	0.773
Communications	24	0.274	0.197	0.000	0.626
Construction	76	0.233	0.161	0.000	0.684
Cost., Cons. & Bus. Cons. or Serv.	447	0.204	0.144	0.000	0.759
Financial & Insurance Activities	17	0.275	0.234	0.000	0.914
Health, Education or Social Service	70	0.227	0.195	0.000	0.735
Manufacturing, Mining & Utilities	61	0.300	0.183	0.000	0.660
Real Estate	55	0.267	0.209	0.000	0.810
Retail, Rest., Wholes. Dist. & Trans.	203	0.224	0.182	0.000	0.945
Total	998	0.227	0.170	0.000	0.945

	N	Entrepreneurial Experience			
		Mean	Std. Dev.	Min.	Max.
Agriculture	44	0.120	0.170	0.000	0.583
Communications	24	0.165	0.225	0.000	0.833
Construction	76	0.088	0.125	0.000	0.558
Cost., Cons. & Bus. Cons. or Serv.	447	0.036	0.069	0.000	0.786
Financial & Insurance Activities	17	0.109	0.146	0.000	0.391
Health, Education or Social Service	70	0.033	0.051	0.000	0.250
Manufacturing, Mining & Utilities	61	0.080	0.082	0.000	0.327
Real Estate	55	0.084	0.117	0.000	0.500
Retail, Rest., Wholes. Dist. & Trans.	203	0.033	0.073	0.000	0.677
Total	998	0.053	0.097	0.000	0.833

Table 2: Descriptive Statistics and Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(1) Rate	1.000													
(2) Concentration ('000)	0.025	1.000												
(3) Timing	1.517	-0.113	1.000											
(4) Av. Formal Education	0.299	0.189	0.278	1.000										
(5) Av. Labor Market Experience	0.490	0.253	-0.081	0.002	1.000									
(6) Av. Labor Market Experience ²	0.227	0.170	-0.018	0.026	0.449	1.000								
(7) Av. Entrepreneurial Experience	0.080	0.106	-0.024	0.039	0.301	0.929	1.000							
(8) Av. Entrepreneurial Experience ²	0.053	0.097	0.046	-0.031	0.191	0.346	0.313	1.000						
(9) Sponsors	0.012	0.046	0.008	-0.017	0.090	0.222	0.221	0.876	1.000					
(10) Supporters	0.022	0.147	0.064	-0.017	0.080	0.011	0.020	0.032	0.017	-0.004				
(11) High-Tech	0.375	0.484	0.057	-0.015	0.024	0.075	0.002	0.010	0.054	0.039	1.000			
(12) Total Devoted Hours	0.226	0.419	-0.006	-0.032	0.030	-0.033	-0.010	0.018	0.014	0.017	-0.003	1.000		
(13) Unemployed	2,208.311	-0.019	0.067	0.001	0.058	0.050	0.036	0.007	0.003	-0.013	-0.009	0.015	1.000	
(14) Work-related Business Idea	0.254	-0.073	-0.014	-0.076	-0.088	-0.080	-0.108	-0.108	-0.056	-0.027	-0.027	0.054	-0.045	1.000
(15) Residual Rate	0.407	0.491	0.086	-0.041	0.079	0.172	0.149	0.088	0.053	0.056	-0.009	0.064	0.020	-0.064
(16) Residual Concentration ('000)	0.000	0.019	0.969	-0.113	0.284	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.038
(17) Residual Timing	0.000	1.468	0.000	0.985	0.159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.045
(18) Agriculture	0.000	0.181	0.280	0.160	0.983	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.052
(19) Communications	0.044	0.205	-0.050	0.039	0.007	0.047	0.149	0.141	-0.032	0.055	-0.011	0.052	-0.058	-0.029
(20) Construction	0.024	0.153	-0.031	-0.015	-0.047	0.043	0.047	0.181	0.021	0.000	0.056	0.002	0.048	0.016
(21) Financial & Insurance Activities	0.076	0.265	0.029	0.003	0.028	0.011	-0.001	0.105	-0.043	-0.043	-0.074	0.010	-0.029	0.162
(22) Health, Education or Social Services	0.017	0.129	0.025	-0.016	0.001	0.038	0.058	0.077	0.057	0.086	0.042	0.003	0.014	0.030
(23) Manufacturing, Mining & Utilities	0.070	0.256	0.004	0.058	-0.004	0.002	0.000	0.022	-0.051	0.015	0.006	-0.017	0.010	0.068
(24) Real Estate	0.061	0.240	-0.007	-0.023	-0.029	0.110	0.103	0.071	0.004	-0.038	0.022	-0.004	0.014	-0.024
(25) Retail, Rest., Wholes. Dist. & Trans.	0.055	0.228	-0.003	-0.041	0.000	0.057	0.077	0.077	0.043	0.024	0.040	-0.057	-0.048	-0.003
(26) Team of 2	0.203	0.403	0.005	0.012	0.004	-0.007	0.014	-0.101	-0.063	0.009	0.041	-0.083	-0.011	0.025
(27) Team of 3	0.318	0.466	0.063	-0.018	0.058	-0.006	0.006	0.006	-0.026	-0.029	-0.061	-0.030	0.022	-0.087
(28) Team of 4	0.050	0.218	0.022	-0.035	0.039	0.004	0.035	0.003	0.028	0.007	0.090	0.007	0.090	0.016
(29) Team of 5	0.031	0.174	0.012	-0.021	0.001	-0.002	0.079	0.055	-0.027	-0.067	-0.000	0.033	0.002	-0.019
	0.005	0.071	-0.001	-0.015	-0.029	0.036	0.035	0.011	-0.007	0.062	0.097	0.007	0.056	-0.001

Variables	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
(15) Residual Rate	1.000														
(16) Residual Concentration ('000)	-0.115	1.000													
(17) Residual Timing	0.289	0.162	1.000												
(18) Agriculture	-0.000	0.000	-0.000	1.000											
(19) Communications	-0.000	0.000	0.000	-0.034	1.000										
(20) Construction	-0.000	-0.000	-0.000	-0.062	-0.045	1.000									
(21) Financial & Insurance Activities	0.000	0.000	-0.000	-0.028	-0.021	-0.038	1.000								
(22) Health, Education or Social Services	0.000	-0.000	-0.000	-0.059	-0.043	-0.079	-0.036	1.000							
(23) Manufacturing, Mining & Utilities	-0.000	0.000	-0.000	-0.055	-0.040	-0.073	-0.034	-0.070	1.000						
(24) Real Estate	0.000	0.000	0.000	-0.052	-0.038	-0.069	-0.032	-0.066	-0.062	1.000					
(25) Retail, Rest., Wholes. Dist. & Trans.	-0.000	-0.000	-0.000	-0.109	-0.079	-0.145	-0.067	-0.139	-0.129	-0.122	1.000				
(26) Team of 2	0.000	-0.000	0.000	0.042	-0.065	0.015	-0.007	-0.036	0.024	-0.023	0.078	1.000			
(27) Team of 3	0.000	0.000	-0.000	0.018	-0.006	-0.031	0.041	0.009	-0.020	-0.015	0.032	-0.157	1.000		
(28) Team of 4	-0.000	0.000	-0.000	0.018	0.010	-0.008	-0.024	-0.004	0.027	0.058	-0.019	-0.122	1.000	1.000	
(29) Team of 5	0.000	0.000	0.000	-0.015	-0.011	-0.020	-0.009	-0.019	0.041	-0.017	-0.001	-0.048	-0.016	-0.013	1.000

*Table 3: OLS Regression with Robust Standard Errors**Dependent Variable = Rate*

Variables	# Activities > 0			# Activities ≥ 10		
	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Av. Formal Education	-0.001 0.003			-0.004 0.004		-0.007 0.005
Av. Labor Market Experience		0.006 0.014	0.001 0.014		0.030** 0.013	0.030** 0.013
Av. Labor Market Experience ²		-0.018 0.018	-0.015 0.018		-0.046** 0.018	-0.045** 0.018
Av. Entrepreneurial Experience			0.036*** 0.013			0.038** 0.016
Av. Entrepreneurial Experience ²			-0.058*** 0.021			-0.066*** 0.024
Residuals Concentration ('000)	-0.002*** 0.001	-0.002*** 0.001	-0.002*** 0.001	-0.002*** 0.000	-0.002*** 0.000	-0.002*** 0.000
Residuals Timing of Concentration	0.033*** 0.007	0.033*** 0.007	0.033*** 0.007	0.022*** 0.006	0.022*** 0.006	0.022*** 0.006
Sponsors	0.010 0.006	0.010 0.006	0.009 0.006	0.012 0.008	0.012 0.007	0.011 0.007
Supporters	0.002 0.001	0.002 0.001	0.002 0.001	0.002 0.002	0.002 0.002	0.002 0.002
High-Tech	0.002 0.002	0.002 0.002	0.001 0.002	-0.000 0.002	-0.000 0.002	-0.000 0.002
Total Devoted Hours	-0.000 0.000	-0.000 0.000	-0.000 0.000	-0.000 0.000	-0.000 0.000	-0.000 0.000
Unemployed	-0.002 0.001	-0.002 0.001	-0.001 0.001	-0.001 0.002	-0.001 0.002	-0.001 0.002
Work related Business Idea	0.005*** 0.001	0.005*** 0.001	0.005*** 0.001	0.006*** 0.002	0.005*** 0.002	0.005*** 0.002
Team Size Controls	yes	yes	yes	yes	yes	yes
Industry Controls	yes	yes	yes	yes	yes	yes
N	860	860	860	512	512	512
R ²	0.14	0.14	0.15	0.12	0.12	0.13

Significance levels: * : 10% ** : 5% *** : 1%

*Table 4: OLS Regression with Robust Standard Errors**Dependent Variable = Concentration ('000)*

Variables	# Activities > 0			# Activities ≥ 10		
	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Av. Formal Education	-0.468*	0.259	-0.655***	-0.680	0.460	-0.966***
Av. Labor Market Experience		0.321 0.980	0.241 1.107 0.961		-0.200 1.760	0.434 0.664 1.620
Av. Labor Market Experience ²		0.433 1.220	-0.207 1.154		1.684 2.243	1.178 2.049
Av. Entrepreneurial Experience			-0.546 0.917 1.117			-0.343 1.252 1.585
Av. Entrepreneurial Experience ²			0.374 1.408			0.064 2.149
Residuals Rate	-12.959*** 3.127	-13.002*** 3.099	-12.913*** 3.162	-13.078*** 3.976	-13.315*** 4.002	-13.837*** 4.267
Residuals Timing of Concentration	1.694*** 0.385	1.687*** 0.381	1.695*** 0.386	1.629*** 0.577	1.598*** 0.563	1.562*** 0.547
Sponsors	-0.061 0.147	-0.047 0.145	-0.052 0.143	-0.041 0.168	-0.033 0.173	-0.024 0.165
Supporters	-0.034 0.107	-0.022 0.104	-0.027 0.110	0.080 0.179	0.083 0.178	0.103 0.200
High-Tech	-0.073 0.070	-0.073 0.069	-0.073 0.067	-0.159* 0.086	-0.157* 0.085	-0.182** 0.092
Total Devoted Hours	0.000* 0.000	0.000* 0.000	0.000** 0.000	0.000 0.000	0.000 0.000	0.000 0.000
Unemployed	-0.145* 0.083	-0.156* 0.084	-0.152* 0.084	-0.255** 0.122	-0.258** 0.123	-0.219** 0.111
Work related Business Idea	-0.144 0.099	-0.127 0.096	-0.183* 0.108	-0.220 0.141	-0.206 0.136	-0.268* 0.156
Team Size Controls	yes	yes	yes	yes	yes	yes
Industry Controls	yes	yes	yes	yes	yes	yes
N	860	860	860	512	512	512
R ²	0.07	0.08	0.08	0.07	0.08	0.09

Significance levels: * : 10% ** : 5% *** : 1%

Table 5: OLS Regression with Robust Standard Errors
Dependent Variable = Timing of Concentration

Variables	# Activities > 0			# Activities ≥ 10		
	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Av. Formal Education	-0.022 0.028		-0.033 0.030	-0.039 0.041		-0.049 0.042
Av. Labor Market Experience		-0.048 0.115	-0.066 0.119		-0.063 0.169	-0.037 0.172
Av. Labor Market Experience ²		0.108 0.179	0.109 1.183		0.136 0.265	0.110 0.269
Av. Entrepreneurial Experience			0.291** 0.126			0.101 0.146
Av. Entrepreneurial Experience ²			-0.360 0.225			-0.110 0.243
Residuals Rate	2.727*** 0.357	2.728*** 0.357	2.731*** 0.359	1.767*** 0.364	1.789*** 0.365	1.767*** 0.362
Residuals Concentration ('000)	0.024*** 0.007	0.024*** 0.007	0.024*** 0.007	0.016*** 0.005	0.016*** 0.005	0.016*** 0.005
Sponsors	0.080* 0.046	0.079* 0.047	0.075 0.047	0.053 0.051	0.052 0.052	0.050 0.052
Supporters	0.008 0.012	0.008 0.012	0.006 0.012	-0.007 0.016	-0.007 0.016	-0.008 0.016
High-Tech	0.019 0.015	0.019 0.015	0.017 0.015	0.033* 0.020	0.032 0.020	0.031 0.020
Total Devoted Hours	-0.000 0.000	-0.000 0.000	-0.000 0.000	-0.000* 0.000	-0.000* 0.000	-0.000* 0.000
Unemployed	-0.014 0.014	-0.014 0.014	-0.011 0.014	0.004 0.019	0.006 0.019	0.007 0.019
Work related Business Idea	0.029** 0.013	0.028** 0.013	0.027** 0.013	0.027* 0.016	0.026 0.016	0.025 0.016
Team Size Controls	yes	yes	yes	yes	yes	yes
Industry Controls	yes	yes	yes	yes	yes	yes
N	860	860	860	512	512	512
R ²	0.14	0.14	0.14	0.10	0.09	0.10

Significance levels: * : 10% ** : 5% *** : 1%

Table 6: Logit Regression with Robust Standard Errors

Dependent Variable = Positive Cash Flow

Variables	# Activities > 0			# Activities ≥ 10		
	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)	Coefficient (R. Std. Err.)
Av. Formal Education	0.706 0.472		0.349 0.516	0.774 0.643		0.549 0.682
Av. Labor Market Experience		1.834*** 0.645	1.924*** 0.700		1.189 0.825	1.279 0.892
Av. Entrepreneurial Experience			-0.542 0.908			-1.283 1.253
Residuals Rate	25.207*** 9.594	25.351*** 9.644	25.636* 9.971	44.687*** 11.023	44.252*** 10.933	44.448*** 10.987
Residuals Concentration ('000)	0.009 0.075	0.008 0.079	0.009 0.066	-0.038 0.112	-0.034 0.089	-0.030 0.089
Residuals Timing of Concentration	1.767*** 0.588	1.792*** 0.588	1.779*** 0.584	3.067*** 0.731	3.021*** 0.730	3.042*** 0.743
Sponsors	-0.824 0.861	-0.813 0.827	-0.897 0.829	-0.833 1.163	-0.895 1.214	-0.827 1.125
Supporters	0.121 0.210	0.109 0.211	0.134 0.213	-0.344 0.272	-0.333 0.272	-0.285 0.277
High-Tech	-0.088 0.264	-0.091 0.266	-0.101 0.271	-0.012 0.322	-0.020 0.324	0.002 0.325
Total Devoted Hours	0.000 0.000	0.000 0.000	0.000 0.000	0.000* 0.000	0.000 0.000	0.000 0.000
Unemployed	-0.090 0.251	-0.086 0.252	-0.091 0.257	0.002 0.331	0.033 0.333	0.013 0.335
Work related Business Idea	0.877*** 0.210	0.853*** 0.213	0.769*** 0.217	1.154*** 0.285	1.101*** 0.292	1.176*** 0.283
Team Size Controls	yes	yes	yes	yes	yes	yes
Industry Controls	yes	yes	yes	yes	yes	yes
N	860	860	860	512	512	512
Log-Likelihood	-315.537	-314.541	-311.517	-194.267	-193.262	-192.027
Chi-Quadrat (21)	43.22			54.55		
Chi-Quadrat (22)		47.14	51.70	54.36	55.06	59.28
Chi-Quadrat (24)			52.86			59.95

Significance levels: * : 10% ** : 5% *** : 1%

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Erklärung

Ich versichere hiermit, dass ich die vorliegende Arbeit mit dem Thema

Different Aspects of the Composition of Nascent Entrepreneurial Teams

ohne unzulässige Hilfe Dritter und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus anderen Quellen direkt oder indirekt übernommenen Daten und Konzepte sind unter Angabe der Quelle gekennzeichnet. Weitere Personen, insbesondere Promotionsberater, waren an der inhaltlich materiellen Erstellung dieser Arbeit nicht beteiligt.³² Die Arbeit wurde bisher weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt.

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³²Siehe hierzu die Abgrenzung auf der folgenden Seite.

Abgrenzung

Ich versichere hiermit, dass ich Kapitel 1 der vorliegenden Arbeit ohne Hilfe Dritter und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe.

Kapitel 2 entstammt einer gemeinsamen Arbeit mit Herrn Christian Hopp (Universität Wien). Die individuelle Leistung im Rahmen dieser Arbeit gliedert sich wie folgt:

- i. Introduction: 50% Sonderegger / 50% Hopp
- ii. Theory and Hypotheses: 40% Sonderegger / 60% Hopp
- iii. Methodology: 50% Sonderegger / 50% Hopp
- iv. Results: 60% Sonderegger / 40% Hopp
- v. Discussion and Conclusion: 50% Sonderegger / 50% Hopp

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- i. Introduction/Conclusions: 50% Sonderegger / 50% Hopp
- ii. Theory and Hypotheses: 40% Sonderegger / 60% Hopp
- iii. Methodology: 50% Sonderegger / 50% Hopp
- iv. Results: 60% Sonderegger / 40% Hopp
- v. Discussion and Conclusion: 50% Sonderegger / 50% Hopp

Konstanz, den 30. Juni 2010

(Rolf Sonderegger)

