Business Model Development, Founders' Social Capital and the Success of Early-Stage Internet Startups: A Mixed-Method Study

Author:
Spiegel, O; Abbassi, P; Zylka, M; Schlagwein, D; Fischbach, K; Schoder, D

Publication details:
Information Systems Journal
v. 26
Chapter No. 5
pp. 421 - 449
1365-2575 (ISSN)

Publication Date:
2016-09

Publisher DOI:
https://doi.org/10.1111/isj.12073

Business Model Development, Founders' Social Capital, and the Success of Early-Stage Internet Startups: A Mixed-Method Study

Olav Spiegel
University of Cologne

Puja Abbassi
University of Cologne

Matthäus P. Zylka
University of Bamberg

Daniel Schlagwein (corresponding)
UNSW Australia, schlagwein@unsw.edu.au

Kai Fischbach
University of Bamberg

Detlef Schoder
University of Cologne

This is a post-print version of a paper forthcoming in Information Systems Journal, http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2575. Cite as: Spiegel, O., Abbassi, P., Zylka, M., Schlagwein, D., Fischbach, K., Schoder, D. (forthcoming). Business Model Development, Founders' Social Capital and the Success of Early-Stage Internet Startups: A Mixed-Method Study. Information Systems Journal.

Abstract. *Information technology (IT) and entrepreneurship are more closely related than ever. The Internet in particular inspires the current 'generation startup'. While some early-stage Internet startups have quickly become major successes, others fail to secure required follow-up funding and collapse. In this paper, we build on and extend the emerging business model research stream with the aim of better understanding the differences between successful and unsuccessful early-stage Internet startups. In the qualitative first part of our mixed-method study, 17 expert informant interviews reveal that Internet startup business models are in permanent flux, continually changed and adapted by founders, who identify their professional social network (i.e., their social capital) as a critically important factor for developing the business model and ultimately making their startups successful. In the quantitative second part of the study, we test this claim based on a social network*

analysis (SNA) of 70 Internet startups and their 145 founders. We find strong support for the critical importance of the founders' social capital for early-stage Internet startup success. The findings of this study advance our understanding of the relationship between founders' social capital, the development of business models, and the success of early-stage Internet startups.

Keywords: Internet startups, social capital, business models, entrepreneurs, mixed-method research.

INTRODUCTION

Information technology (IT) and entrepreneurship are having a love affair, because 'IT is the magic ingredient that inspires and most often enables contemporary entrepreneurial endeavours' (Del Giudice & Straub, 2011, p. III). This link between IT and entrepreneurship is especially salient in the context of Internet startups (McKnight *et al.*, 2002; Kollmann, 2006; Serarois-Tarrés *et al.*, 2006), which leverage Internet technologies and the economics of digital products (e.g., network effects) to gain a competitive advantage through early market entry (Grover & Saeed, 2004). Some Internet startups have quickly become major successes that influence the lives of millions: Google, Skype, Facebook – and more recently Dropbox, WhatsApp, Instagram, and many others. Many more Internet startups, however, have failed and gone out of business.

The success of Internet startups depends heavily on the founders' ability to develop their business models – which may take years of continuous adaptation (Poole, 2001; Andries & Debackere, 2007). Successful Internet startups are able to adapt their business models continually, while maintaining liquidity (through funding) to support their operations (Grover & Saeed, 2004). Securing 'second round' or 'Series A' funding (i.e., a major investment by venture capitalists to support growth) is widely considered as a factor that distinguishes successful from unsuccessful startups (Burton *et al.*, 2002; Davila *et al.*, 2003; Baum & Silverman, 2004). According to one estimate, only 40 per cent of early-stage Internet startups are able to secure required Series A funding (Taylor, 2012).

The aim of this paper is to understand better why some early-stage Internet startups achieve this success while others do not (with success being considered as achieving Series A funding). We build on and extend two distinct research streams – business model research and entrepreneurship research – to gain new insights into the 'inner workings' of early-stage Internet startups.

Of late, the business model concept has seen growing attention from research and practice (for recent reviews see Lambert & Davidson, 2013; Veit *et al.*, 2014). A business model is 'the design of organizational structures to enact a commercial opportunity' (George & Bock, 2011, p. 99) – in short, it describes how organizations deliver value to their customers. The business model concept is helpful for gaining a more detailed understanding of the 'inner workings' and nature of a business (Al-

Debei & Avison, 2010). However, substantive empirical IS research on business models is lacking (Zott *et al.*, 2011; Veit *et al.*, 2014). Further, the link between the business model and firm performance, as well as the process of business model change and development, are poorly understood (Al-Debei & Avison, 2010; George & Bock, 2011). What has been reported in prior research is that startups often change and adapt their business models (Shirky, 2008; McGrath, 2010; Teece, 2010). This may be especially relevant for early-stage Internet startups, where technological change and limited experience with reference products and services may require substantial changes to the business model. Internet startup success and the ability to perform continual adaptation of the business model are closely linked (Grover & Saeed, 2004). This leads us to our first research question: *What are the characteristics of early-stage Internet startup business models and how are these actually developed?* We answer this question primarily through the qualitative first part of our study.

Some literature claims that business model development depends heavily on the founders' abilities (Andries & Debackere, 2007; Trimi & Berbegal-Mirabent, 2012). Entrepreneurial research often focuses on the founders (i.e., entrepreneurs) rather than on the business model. The central question here is: why is it that some people are able to discover and exploit business opportunities while others are not (Shane & Venkataraman, 2000)? Studies of individual entrepreneurs in other empirical contexts have found that the founders' social capital (i.e., their social networks and personal relationships) is helpful in identifying new business opportunities (Ardichvili *et al.*, 2003; Bhagavatula *et al.*, 2010). Social capital may be particularly relevant for early-stage Internet startups because it can provide founders with access to critical knowledge, resources, and investors. This is a perception commonly held in the 'Internet startup scene', but it is based on anecdotal evidence. In light of the above claims in the literature and the common perception in practice (evident through our qualitative investigation as well as practitioners' writings), we ask a second research question: *Are early-stage Internet startups with better-connected founders more successful?* We answer this question through both parts of our study, adding to the qualitative a specific empirical test in the quantitative second part of our study.

To answer these two research questions, we designed a mixed-method study (Teddlie & Tashakkori, 2009; Creswell & Plano Clark, 2011). We conducted expert informant interviews with 17 Internet startup founders in the first part of our study and

learned that founders consider the business model to be in permanent flux in the early startup stage. Further, they attributed key importance to their social capital for developing the business model and making their startups successful. Building on this finding, in the second part of our study we analysed a unique dataset covering 70 Internet startups and their 145 founders using social network analysis (SNA) techniques and found that better-connected founders were much more likely to create successful startups. Based on the overall findings of the study, we conclude that business models of early-stage Internet startups are highly dynamic and that founders leverage their social capital in developing the business model. Well-connected founders are most critical for the success of early-stage Internet startups.

The remainder of the paper is structured as follows. First, we review related empirical and theoretical work. We then explain our research design. After that, we present the findings and analysis, first of our qualitative study and then of our quantitative study. We discuss the theoretical and practical implications of the findings before concluding our study.

RELATED WORKS AND THEORETICAL FOUNDATIONS

Because of the interdisciplinary nature of the research, our review of the related literature needs to cover several different (and largely disconnected) literature streams. We therefore focus on a selection of key papers that inform our study and provide references to dedicated reviews of the different streams for the interested reader.

The business model concept (it is not a ‘theory’ as such) is critically important for this study and offers a theoretical approach for studying the ‘black box' of what happens within firms. This is in contrast to traditional industry analysis that treats firms within one industry as essentially equal. The business model concept builds on two theoretical lenses. The market-based view draws from Porter’s value chain concept (1985) and the extended notions of strategic positioning (Morris *et al.*, 2006). Further, the business model concept builds on the resource-based view of the firm (Wernerfelt, 1984; Barney, 1986) and related theories such as the knowledge-based view (Nonaka, 1994) and the dynamic capabilities/absorptive capacities perspective (Cohen & Levinthal, 1990; Teece *et al.*, 1997; Zahra & George, 2002). While it is beyond the scope of this paper to discuss the claims of these theories in detail, they

share a common theme in that they aim to explain differences in firm performance by achieving sustainable competitive advantages through a firm's strategic market position, the various resources available to the firm, and the firm's ability to use these resources effectively and efficiently. The business model perspective acknowledges the role of resources and capabilities (Hedman & Kalling, 2003) but goes beyond this 'possession' perspective to consider explicitly other factors relevant to firm performance such as external value networks and the design (structure) of value creation (e.g., Al-Debei & Avison, 2010; George & Bock, 2011; Zott *et al.*, 2011). Hence, we find the business model perspective an appropriate, contemporary framework to study the differences between Internet startups.

The emergence of the business model concept is closely related to the emergence of the Internet in the mid-1990s (Zott *et al.*, 2011). Since then, it has seen increasing and substantial attention, especially in the fields of entrepreneurship (George & Bock, 2011), strategic management (Zott *et al.*, 2011), and information systems research (Al-Debei & Avison, 2010). Only recently, several efforts have been made to bring a unifying structure (Krumeich *et al.*, 2012) and a frame of reference to the different business model research streams (Al-Debei & Avison, 2010; George & Bock, 2011).

As noted above, we follow the straightforward business model definition of George & Bock (2011), who emphasize the role of opportunity discovery, ideation, and enactment. Ultimately, business models create value by exploiting the underlying opportunity (George & Bock, 2011). The value proposition describes the benefits customers can expect from products and services (Osterwalder *et al.*, 2014), and it is widely considered as a key business model element (see Afuah & Tucci, 2001; Chesbrough & Rosenbloom, 2002; Morris *et al.*, 2005; Al-Debei & Avison, 2010; Burkhart *et al.*, 2011; Krumeich *et al.*, 2012, among others). Finding the right fit between what a company offers and what customers want (i.e., the product-market fit) is crucial to any business model (Osterwalder *et al.*, 2014).

Al-Debei & Avison (2010) identify three additional common elements of business models in the literature: value architecture (i.e., the configuration of assets, resources, and core competencies), value network (i.e., the relationships to customers and other stakeholders such as partners, suppliers, etc.), and value finance (i.e., the financial setup in terms of costing, pricing, and revenue structure). However, despite these recent efforts, the exact conceptualization of the business model remains a matter of ongoing discussions in academia (e.g., Burkhart *et al.*,

2011; Lambert & Davidson, 2013). Further large-scale empirical analyses and conceptual work are needed to advance our understanding of business models (Al-Debei & Avison, 2010; Burkhart *et al.*, 2011; Veit *et al.*, 2014).

How is the business model relevant for explaining the performance and success of the firm? Previous studies have analysed the impact of different business model configurations on financial performance, (e.g., revenue growth, profitability, market capitalisation), and equity growth, as well as non-financial performance, such as resilience in challenging markets and the ability to provide social value to stakeholders (Lambert & Davidson, 2013). In the entrepreneurial context, prior work has primarily looked at more mature firms in their later stage of development: It has been shown that firms with business models that include novel elements (e.g., innovative combinations of products, services, and information) outperform those with business models that do not include such novel elements (Zott & Amit, 2007). From a dynamic perspective, initial empirical evidence suggests that business model adaptation and firm performance are positively related in new businesses (Andries & Debackere, 2007). The latter result corresponds to the argument that business models are inherently dynamic (Hedman & Kalling, 2003; MacInnes, 2005; Osterwalder *et al.*, 2005; Al-Debei & Avison, 2010), especially so in the IT industry (Trimi & Berbegal-Mirabent, 2012). It is considered a best practice to challenge and revise the business model continually (Blank, 2005; Osterwalder *et al.*, 2010; Ries, 2011). That is, rather than having a static business model, startups need to be dynamic, and sometimes even consider pivots – ‘structured course corrections’ (Ries, 2011, p. 103).

The goal of business model development is to find viable value propositions and create organizational structures that allow for exploiting the underlying opportunities (Blank, 2005; George & Bock, 2011; Osterwalder *et al.*, 2014), which in the end determines success or failure of a (startup) firm. In some cases this business model development can take years of continuous adaptation (Poole, 2001; Andries & Debackere, 2007). Startups go through several stages of development, which usually include modifications of their business models. Kollmann (2006) describes three distinct development phases: ‘early stage’, ‘expansion stage’, and ‘later stage’. As noted before, we focus on the early stage of startups (also called the startup stage, or seed stage), which can be described as ‘the state of a company when it has just been incorporated and its founders are developing their product or service’ (NVCA,

2013, p. 74). The early stage begins with the initial work on the startup (i.e., the founders begin to work on an initial idea) and typically ends with either the startup receiving Series A funding or the startup being discontinued. During the early stage, companies are typically funded by founders' savings, friends and family, angel investors, or seed funding.

Measuring the success or performance of entrepreneurial firms is not trivial. For instance, Andries & Debackere (2007) measure their long-term survival rate, while Zott & Amit (2007) refer to stock market values. However, these are measures for companies in their later stages. Early-stage startups are different: unlike publicly traded companies, they are not required to publish company data. Revenues (which often do not exist) or growth rates are widely considered not fully representative of an early-stage startup's real value.

What defines success for an early-stage startup? Typically, founders, investors, and market observers consider it a success if the startup is evaluated positively by (i.e., receives funding from) a venture capitalist (VC) (Baum & Silverman, 2004), which 'confirms the quality of the company and decreases the uncertainty about its potential success. … The credibility associated with a funding event – emanating from the information available to the VC firm as well as its reputation – gives a strong signal about the quality of the startup' (Davila *et al.*, 2003, p. 692). That is why, in this study, we follow prior research in that we consider the success of early-stage startups as obtaining Series A funding through a VC (Burton *et al.*, 2002; Davila *et al.*, 2003; Baum & Silverman, 2004).

Having argued for the importance of business models and their dynamism, as well as for Series A funding as an indicator of success for early-stage startups, we now must turn to the core question of what makes an early-stage startup successful.

At its core, entrepreneurship is about people and their processes around discovery, evaluation, and exploration of business opportunities (Shane & Venkataraman, 2000). Technology is critical, but it is ancillary to the people who take advantage of the business opportunities around them (Blank, 2005). From this perspective, business models do not work on their own; rather, they need to be implemented and continually adapted by capable entrepreneurs (Chesbrough, 2010). In fact, VCs regard the management team as most important when they evaluate investment opportunities (Muzyka *et al.*, 1996). In particular, entrepreneurs need to be able to explore and exploit technological capabilities and business opportunities (Blank,

2005; Blank & Dorf, 2012). The search for a viable value proposition is a continual, iterative process of designing and testing prototypes (Osterwalder *et al.*, 2014). A central finding of entrepreneurial research is that the abilities of people in otherwise comparable situations vary widely in these regards (Shane & Venkataraman, 2000). These performance differences of entrepreneurs (or, in the case of startups, founders) may also strongly affect the success of their startups.

Typically, entrepreneurial research has studied the question of success and performance differences by examining the personal abilities of individuals (Zhao *et al.*, 2010) and human capital (for a review see Unger *et al.*, 2011). Less understood is the role of the founders' social capital, which Stam *et al.* (2014) found significant in explaining the performance of small firms. Granovetter (1985) was among the first to argue that all economic action should be considered as embedded in social structures. Research on social capital focuses on explaining the performance and success of any individual actor embedded in (and as a function of) the surrounding social structures (Borgatti & Foster, 2003).

Social capital has been defined as 'the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit' (Nahapiet & Ghoshal, 1998, p. 243). Social capital may have significantly greater impacts than human capital for small businesses (for a review, see Stam *et al.*, 2014). Researchers have singled out repeatedly the benefit of social capital for firms that results from the ability of individuals with high social capital to identify new business opportunities for the firm (Ardichvili *et al.*, 2003; Bhagavatula *et al.*, 2010). Based on that argument, we infer that social capital is also relevant for the success of early-stage Internet startups, and likely even more so than human capital. This underscores the relevance of this study as it integrates the business model perspective (firm level) with research on the human and social capital (individual level) of entrepreneurs/founders in the context of early-stage consumer Internet startups.

Research on business models has certainly acknowledged the value of networks. For example, Al-Debei & Avison (2010) argue in their summary and review of IS research on business models that the success of a firm depends to some extent on the firm's relationships with other actors. However, networks as part of a business model are typically conceptualized and considered as value networks, that is, firm-level cooperation of suppliers, customers, and partners (Hedman & Kalling, 2003; Al-Debei

& Avison, 2010; Zott *et al.*, 2011) as opposed to the personal networks and network resources available to the founders (i.e., social capital of founders). While social capital certainly helps establish firm-to-firm relations, the two concepts are distinct. Social capital is an individual-level concept, while value networks are a firm-level concept. In addition, social capital precedes value networks in that founders, when they begin to create a startup, typically do so with a substantial amount of combined social capital (probably the firm's only resource at this point), while the value network of the startup is typically non-existent at the beginning. Our argument picks up from a suggestion in the dynamic capabilities literature that 'social capital and external ties that individual team members bring with them may constitute important endowments of the founding team' (Helfat & Peteraf, 2003, p. 1001) in early-stage startups.

In summary, we are interested in the factors that make early-stage Internet startups successful and how the founders develop their business models. We deduce from theory and the literature that social capital previously overlooked may yet be an important factor in that success. As empirical studies directly exploring the mechanisms and testing the impact of the suspected effect are not available, we conducted an empirical investigation in the context of early-stage Internet startups.

RESEARCH DESIGN

We used a sequential mixed-method design (Teddlie & Tashakkori, 2009; Creswell & Plano Clark, 2011) in our research. Mixed-method research has been strongly advocated in IS because it allows researchers to gain a more complete understanding of complex technological, organizational, and social phenomena of interest in our discipline (Avison & Fitzgerald, 2012; Ågerfalk, 2013; Venkatesh *et al.*, 2013).

Some scholars take the broader perspective that mixed-method research (or, multi-method research) refers to any research investigation that employs more than one method (Mingers & Brocklesby, 1997; Mingers, 2001; 2003), while other scholars are referring specifically to the combination of qualitative and quantitative research

methods (e.g., Venkatesh *et al.*, 2013).[1] Our research design is mixed-method according to both perspectives.

We followed the most common type of mixed-method investigation, a sequential design (Creswell & Plano Clark, 2011).[2] First, we used interviews with Internet startup founders (i.e., expert informant interviews) to explore the issues qualitatively. These interviews were conducted in an open-ended fashion and we paid close attention to the interpretations and sense-making of the experts. The aim of this first part was to achieve a rich, context-aware exploration of the phenomena of interest – business model development and the role of social networks for early-stage Internet startups. Second, we used social network analysis to test quantitatively the central hypothesis of this paper, that is, that there is a strong, dominant, positive effect of social networks of founders on their startups' success. The integration of expert interviews and social network analysis has been singled out as one of the most fruitful applications of mixed-method research (Venkatesh *et al.*, 2013).

We describe both parts of our research – and how we integrated those two parts – in detail below.

Expert Informant Interviews

We conducted a series of semi-structured and open-ended interviews (Myers, 2013) with founders of Internet startups (see Appendix A for details on the participants). The interviews were based on an interview guideline we adapted over time to account for emerging insights or additional questions (see Appendix B for interview guidelines). We used a purposeful sampling strategy (Shadish *et al.*, 2001) in selecting and approaching the interviewees. Specifically, we wanted to stay within specific boundaries (consumer Internet startups in or shortly after early stage) while maximizing variety within these boundaries (e.g., experience, location, business model type). To secure the preferred interview partners, we used the professional

[1] All authors cited in this paragraph suggest that mixed-method research is valid (and valuable) – despite claims of the 'incommensurability' of the research philosophies justifying in particular research methods. The incommensurability claim (in relation to mixed-method research) has been disputed both by pragmatists and by critical realists on philosophical grounds. One core counter argument put forward against such a claim is that research methods provide *additional* and *complementary* insights on complex phenomena. Indeed, we found applying two different lenses (two methods) valuable for generating richer insights in relation to our research aim. For a more detailed discussion of the possibility and validity of mixed-method research consult, for example: Mingers & Brocklesby (1997), Mingers (2001) and Venkatesh *et al.* (2013).

[2] Note that sequential design refers to the logical design of the study. Some interviews (or follow-ups) were conducted after the quantitative analysis. In that sense, the research process was hermeneutic and iterative in nature (rather than one-way linear).

ties of members of the research team with startup organizations and the startup community.

The interviews took place via phone, video conferencing, or in person in 2013 and 2014. We transcribed the interviews in full to allow for coding analysis. We also included natural, secondary data such as press releases and publicly available third-party interviews (with other founders) for our analysis (Silverman, 2011). We used the software NVivo (Version 10) for coding. The conduct and analysis of the interviews were done iteratively and we adopted our interview guide over time to account for emerging insights (e.g., new aspects that seemed relevant).

For the coding and analysis process, we used the approach suggested by Lichtman (2013).[3] First, one author provided the initial coding of the data. In the initial coding process, we used both *in vivo* codes (i.e., codes that use terminology of the interviewees) as well as extant theory (i.e., terminology from the academic literature) to inform our naming and attribution of codes (Hsieh & Shannon, 2005). We then merged identical codes and resolved issues with different understanding of the meaning of codes in the research team through review, discussion, and clarification. Next, we aggregated codes to categories (higher-level constructs that describe several codes on a more abstract level). Again, we resolved different understanding of categories and interpretations through review, discussion, and clarification. We refined coding and categories over time by removing or merging unnecessary/redundant codes and categories. After developing categories, several researchers re-read all founder interviews to identify relationships between (e.g., structures in terms of cause-and-effect or timely order) and within categories (i.e., identified sub-categories). We then organized the categories into main concepts with respect to the main argument (i.e., linked to the research aim). The research team discussed the final categories, sub-categories, and their links, and resolved remaining ambivalences. This process was not linear. We conducted further interviews and iteratively followed with the process of coding and abstracting (generating and relating categories) until changes in our understanding were minimal, and we concluded the investigation having reached theoretical saturation.

[3] Lichtman's process is in turn closely aligned with the coding techniques used in thematic analysis (e.g., Ezzy, 2002) or in the grounded theory method (e.g., Charmaz, 2014).

We used the qualitative findings to inform the quantitative part of the study. Specifically, the qualitative investigation allowed us to develop propositions and operationalize two of them into a hypothesis that could be meaningfully tested using (natural) quantitative data.

Social Network Analysis

For our quantitative data analysis, we collected different, complementary types of quantitative data. The data collection for this part of the study began in 2013 and was further complemented in 2014. We used several publicly available databases and sources to compile a unique dataset that encompassed 70 U.S. consumer Internet startups and their 145 founders. As the first step, we collected information from the CrunchBase (CrunchBase, 2014), AngelList (AngelList, 2013), and U.S. Securities and Exchange Commission (SEC, 2013) databases. These databases provided us with information about the business models of the startups and their funding information. We complemented this data with information available from the startups themselves (e.g., on their websites or in press releases). Second, we gathered publically available data from a large business online social networking site that provided indications of the founders' human capital (e.g., educational background or experience) and social capital (e.g., previous employers and experience – commonly held to be good indicators of social capital). The previous employers' data from the social networking site created a network of 29,419 companies. Note that we aggregated at the level of the startup in the case of co-founders.

We performed social network analysis (SNA) of the previous employers' network data to test for a correlation between the social network of founders and the success of their startups. SNA can determine properties of networks and nodes in these networks (Wasserman & Faust, 1994). Centrality, a common SNA measure, measures how central and well connected a node (here: a company) is. Eigenvector centrality, one particular SNA measure of centrality (Bonacich, 1972), assigns relative scores to all nodes in the network based on a recursive principle that connections to high-scoring nodes contribute more to the score of the node in question than connections to low-scoring nodes. Because we were looking at startups in a network of companies, we used Eigenvector centrality, which is considered an excellent SNA measure of social capital (Borgatti *et al.*, 1998). We chose not to use the directed weighted Eigenvector centrality because we wanted to include all previous employers

– increasing diversity of inbound flows – rather than concentrate on a few high-intensity turnover relationships. Thus, we calculated the directed unweighted scaled Eigenvector centrality for each startup node. We used the software Gephi (Bastian *et al.*, 2009) for the SNA analysis.

Finally, we performed additional, more conventional statistical tests on the other data to test for correlation between a variety of other factors and the success of the startups. Depending on the nature of the underlying data, we either used a 2-sided Fisher's exact test or a regular 2-sided *t*-test (Hair *et al.*, 2010).

The findings of this analysis of the quantitative data provided further evidence to support the propositions developed earlier. Below, we first report the findings from the expert informant interviews (qualitative part of the study) before moving on to the findings from the social network analysis (quantitative part of the study). Further below, we then provide an integrated discussion of these findings.

EXPERT INFORMANT INTERVIEWS: ANALYSIS AND FINDINGS

All of our interviewed founders referred to Internet startup business models as being inherently dynamic. They considered the nature of startup business models to be substantially different from the business models of established companies. Most founders distinguished between the 'vision' (core idea), which was seen as stable, and the business model (operationalization), which was seen as volatile. This core idea was typically abstracted from specific details such as the value proposition or target customers, but it drove and influenced the development of a concrete business model.

Founder F explained:

> 'The core idea, for us, was always the same. What did change over time was everything else'.

The founders considered it precisely the purpose of an early-stage startup to 'define and refine' the business model. Specifically the context of Internet startups is an ideal environment to develop business models dynamically because required investments (e.g., development costs) are low and different configurations of the business model can in most cases be directly tested and iterated with potential customers.

The founders participating in the study were quite explicit that in early-stage Internet startups most elements of the business model need to be considered inherently

dynamic. They attributed different degrees of dynamism to different elements of the emerging business model. A few considered single elements of their business model as being relatively stable, such as the intended monetization model. However, even in these cases the founders were not completely sure about the long-term stability of these elements either as a whole (e.g., moving from a business-to-business to a business-to-consumer business model) or at least in their adjustment over time (e.g., the exact price point inside a freemium monetization plan).

Based on these observations, we propose:

> *Proposition 1: The business models of early-stage Internet startups tend to be dynamic.*

The founders themselves are the most stable element of the business model – or the startup if founders are considered external to the business model. The founders are the fixed point around which the business model evolves through multiple iterations.

An investor explained why he considers the business model less important than the founder team for his investment decisions:

> 'If bad comes to worse, can we reuse the founders for another [business] idea?' (Investor A)

Similar views regarding the pivotal role of the founders in early-stage Internet startups are held by leading investors such as Ron Conway and Chris Dixon (see Clark, 2011) or Dave McClure (see Patterson & Arnold, 2010). As the famous venture capitalist William Draper III concluded:

> 'You have to make sure that you have the right entrepreneur team. Nothing is more important. In fact, nothing is even a close second'. (see Lewis, 2011).

The founders conceptualized themselves as the creators or the enablers of the business model. They found themselves inherently central to the startup in its early stage. Summarizing the above, we propose:

> *Proposition 2: The founding team is mainly stable and plays a pivotal role for business model development in this early stage.*

Rather than having a clear strategy in mind for their business models, the founders typically reported following trial-and-error, minimum-viable-product, and A-B-testing approaches[4] for their business model development. They further noted that the ability

[4] These approaches are short-cycle, iterative approaches to changing and testing the assumptions underlying a particular business model (e.g., Ries, 2011). The 'lean' and 'agile' approaches of business model development

to adapt the business model quickly is more important than a clear strategy in the early stages of an Internet startup. Strategy was considered an abstract, high-level concept more relevant in later stages, after the business model was more stable. Founder G noted:

> 'Keeping agile. I would say being on my toes and changing directions; assessing things on the go is more important than sticking to a strategy which you are not very clear about'.

Based on these observations, we propose:

> *Proposition 3: The founders typically follow an agile trial-and-error approach in developing and adapting their business model.*

What further stood out in the interviews was the high importance founders attributed to their social networks, especially professional social networks. All founders had leveraged in some way their social networks. Nearly all founders interviewed found it very important or even the most important factor for the success of their startup.

Founder J said his 'social network has a huge impact and it is amazing how it is working for me'.

Similarly, founder F said 'my network is … *the* success factor, to be honest'.

Founder E saw the social network as a resource of his startup: 'The network is the most essential part of my company …'

There were, however, exceptions to this general perception. Two of the 17 founders that participated in the study did not rely on their networks as centrally as the others. One stated that he used his social network only for emotional support, but that it was secondary for the business of the startup. Another preferred building strong personal relationships with a few people rather than leveraging a broad set of contacts.

Asked why their social networks were so important, the founders reported a broad range of benefits. More than half mentioned reputational benefits they gained through their networks. Having previously founded a successful startup or having worked at major consulting firms helped secure funding for the business model. Founder E explained his success in securing (Angel/Seed) funding as follows:

---

aim to reduce the number of spectacular large-scale earlier Internet venture failures often associated with the burst of the 'dot com bubble'.

> ‘It would have never been possible to raise this much money in this short time, and having this much product without having said elements already. All of the investors are looking at my track record and everybody who knows me’.

All Asian founders corroborated the importance of status flows (i.e. flows of legitimacy, power, and recognition) through their social network and underscored the high importance of these reputational benefits for their startup. Conversely, for the Western founders, these were less central and they generally attached less importance to status flows.

Almost all founders reported information benefits from their social networks. For example, the founders reported having received relevant information and news, new ideas for their business model, and general feedback through their social networks. They also used their social networks as the key resource for advice on, and learning the skills necessary for dealing with, business, technology, or legal issues in their business model development.

Social networks were seen as providing important access to potential employees and external contractors (e.g., designers, lawyers, HR firms).

Networks were also central to many startups with respect to co-founders: they connected either specifically through searching for co-founders or by virtue of having previously worked or studied together. Some also found customers and partner companies through their social networks, and some gained access to office space and equipment.

Finally, one important benefit mentioned consistently in the interviews was that networks provided access to investors and hence funding. Nearly all the founders we interviewed received introductions to their future investors through contacts with which they already had a connection.

Investor A explained the importance of personal introductions through social networks:

> ‘If they [founders] come to us [for funding] over network [through introductions], they need some kind of network. So, yes, the stuff we are looking at has a certain network … They can use [a network] to get the right angels on board and the right one, two, three customers’.

The importance of social introductions and relationships for funding is generally accepted in practice (Nivi, 2008; Wertz, 2013). For example, Chris Wand, Managing Director at Foundry Group (a U.S.-based early-stage venture capital firm), explains:

> ‘VCs are generally bombarded by requests for meetings, so a warm introduction helps an entrepreneur’s request float to the top of the list’. (as quoted by Nivi, 2008)

In summary, we found in the data that the founders’ social networks provide them with information, resource, and status benefits. For instance, they receive feedback on their ideas and concepts, gain partners and customers, get access to required resources, and raise funding through their networks. All of this helps them develop their business model and establish a successful startup.

> *Proposition 4: High social capital (i.e., being well connected) of the founders in early-stage Internet startups has a positive impact on the success of their startups.*[5]

Based on the observations concerning the importance of founders’ social networks, we spent considerable time in the interviews probing more deeply into the nature and origins of these social networks.

The founders reported that the relevant social networks included friends and family, in some cases formalized relationships (e.g., mentors), and most often professional contacts (especially from prior work, such as former co-workers). Such social relations can also lead to ‘getting introduced’ and ‘establishing critical connections’.

Within the professional social network, founders found former co-workers as well as current or former investors and mentors to be the most helpful types of contact. Former co-workers (including bosses, mentors, or friends from previous workplaces) helped primarily by providing access to specific skills (e.g., legal advice, technical expertise) or through introductions to business-relevant contacts (e.g., investors, media). Typically, such transactions were social in nature and did not involve a monetary component. Friends and family were mentioned primarily as sources of emotional and motivational support.

All founders reported that they began working on their startups with substantial existing social networks based on their previous careers (especially employment and education). The key origin for their professional social networks was the founder’s career history. Founder F explains this important relationship:

[5] The aggregated benefit of being central to one or several social networks is typically referred to as ‘social capital’ in the literature. Some of the founders also used this term. For these reasons, we use the term social capital in the proposition.

‘I’m a lawyer. So, at the beginning, the patent lawyers, the corporation lawyers, and all these, they didn’t charge a dime for us. … When [co-founder’s name] started talking about this to insurance companies, he always went directly to the board of directors because he did projects with them back then [in the co-founder’s previous position]’.

In summary, the founders we interviewed stated that they benefitted most from professional contacts and that they actively managed their social networks. The most critical source for their social networks in the early stage stemmed from their career history, with some friends and family as well as investors and mentors also forming part of the social networks relevant for their business model development. We thus conclude with a final proposition:

Proposition 5: The founders’ professional contacts stemming from their career history are the most important source of social capital.

SOCIAL NETWORK ANALYSIS: ANALYSIS AND FINDINGS

We used propositions 4 and 5 to develop a testable hypothesis suitable for a larger-scale test (Whetten, 1989). To operationalize and measure ‘social capital (i.e., being well connected) of the founders in early-stage Internet startups, we created the social networks of all founders, aggregated them per startup, and calculated the Eigenvector centrality as detailed in the method section and Appendix C. As noted above, if people are nodes in a network, then the Eigenvector centrality provides an excellent measure of their social capital (Borgatti *et al.*, 1998).

To operationalize and measure ‘success of their startups’, we considered a binary variable: 1 if the startup successfully secured Series A funding (considered the ‘successful group’) and 0 if the startup was unable to secure Series A funding (considered the ‘unsuccessful group’). As noted above, Series A funding is widely considered the central and most important performance indicator for early-stage startups (Burton *et al.*, 2002; Davila *et al.*, 2003; Baum & Silverman, 2004).

Hypothesis: The combined social capital of the founders (as measured by their startup's Eigenvector centrality) has a significant positive impact on the success of their early-stage Internet startup (as measured by obtaining Series A funding).

We performed a *t*-test to assess the statistical significance of the group difference between the successful group and the unsuccessful group of startups. The result of the *t*-test confirmed that the means of the two groups are significantly different (t = -3.283, p = 0.002). Levene's test for equality of variances was not significant (p = 0.606), which indicates equal variances across both groups. Thus, the hypothesis was supported by the data at the 0.01 significance level.

Table 1. Results from Tests of Association (N=70, Showing p-Values and Significance Levels)

Category	Measure	Successful startups	Unsuccessful startups	Significance of difference	Test type
Social capital	Founders' network centrality	21 (30%)	49 (70%)	0.002***	b
Human capital factors	Average number of (co-) Founders	2.238	2.000	0.270	b
	VC experience	3 (14%)	4 (8%)	0.421	a
	Consultant experience	6 (28%)	17 (34%)	0.783	a
	Prior founder experience	10 (47%)	34 (69%)	0.108	a
	Average years of education	4.786	3.699	0.074*	b
	Average years of work experience	9.572	9.446	0.936	b
Entrepreneurial self-efficacy	Management	19 (90%)	40 (81%)	0.485	a
	Financial	15 (71%)	36 (73%)	1.000	a
	Risk	16 (76%)	38 (77%)	1.000	a
	Innovation	11 (52%)	30 (61%)	0.599	a
	Marketing	13 (61%)	29 (59%)	1.000	a
Computer efficacy	General IT	15 (71%)	31 (63%)	0.590	a
	Web 2.0	9 (42%)	24 (48%)	0.795	a
	Design	2 (9%)	10 (20%)	0.325	a

a = Fisher's exact test; b = *t*-test (2-sided); significant at * α = 0.100; ** α =0.050, *** α =0.010

In addition to testing the hypothesis (i.e., the impact of founders' social networks), we also controlled for some other factors that could potentially affect funding success. These include typical human capital factors such as education and work experience (Lazear, 2004; Lambert & Davidson, 2013), as well as specific entrepreneurial (see

Chen *et al.*, 1998) and technological skills (see Compeau & Higgins, 1995) required in the context of Internet startups.

We found that founders' experience and specific skills were all statistically insignificant as antecedents of startup success, and that only years of education were moderately significant at the 0.10 level. The results indicate that human capital has a lower impact on startup success than social capital.

DISCUSSION

The analysis of the qualitative data revealed that the business models of early-stage Internet startups are typically very volatile and in permanent flux. Despite that the founders attributed different degrees of dynamism to different elements of the emerging business model, even the relatively stable elements would or could change, or were at least adjusted over time. Thus, a business model in this context cannot be conceptualized meaningfully as an ontological static 'map' of a fixed structure already existing in reality. Rather, a business model in the early-stage phase is better understood as a conceptual structure for rapidly changing components that describe 'the rationale of how an organization creates, delivers, and captures value while delivering products or services to customers' (Osterwalder *et al.*, 2010, p. 14). The founders continually adapt and change the dynamic elements in an on-going search for a repeatable and scalable business model (see Blank & Dorf, 2012). In short, the business model is developed in this stage and changes significantly and rapidly. This finding adds empirical evidence to earlier research that considers business models as being inherently dynamic (Hedman & Kalling, 2003; MacInnes, 2005; Osterwalder *et al.*, 2005; Al-Debei & Avison, 2010; Trimi & Berbegal-Mirabent, 2012).

It was surprising that, as it turned out, the founders did not follow a clear strategy in developing their business model; rather, the business model evolved around a 'core idea'. This finding is in contrast to other research that considers an organization's strategic orientation as being the result of deliberate choices (e.g., Grover & Saeed, 2004).

We found that the founders' social networks – especially their professional network connections – are critical for the success of the startup (and hence the business model that is enacted through the startup). This finding supports prior research that

suggests social networks provide information, resource, and status flows. To this literature, we add how these network benefits help in actually developing the business model.

As introduced before, we refer to Al-Debei and Avison (2010) for a more granular view on business models and their underlying dimensions – value proposition, value architecture, value network, and value finance. Information flows include the flow of information between individuals across their strong and weak ties (Friedkin, 1982), for instance competitive insights (Harrigan, 1986), but also knowledge transfers (Chrisman & McMullan, 2004). In our study, the founders mentioned having received both – new ideas and feedback for their business model as well as latest technological, business, and legal knowledge. Obtaining such knowledge is especially relevant at the early stage of a startup and has a significant impact on its long-term survival (Chrisman & McMullan, 2004). Consequently, information flows are relevant for all four business model dimensions; for example, constant feedback and new ideas help in shaping the value proposition as well as the revenue structure and pricing method (both part of the value finance dimension).

Resource flows include access to critical resources and transfer of assets such as money, equipment, and technology (Madhavan *et al.*, 1998; Gnyawali & Madhavan, 2001). In the early stage, the startup typically comprises the founder team (or a single founder) as its only resource. Our interview partners mentioned access to potential employees (or prospective co-founders), external contractors (e.g., developers, lawyers, etc.), customers or business partners, and investors through their networks as being critically important. These resource flows primarily help in further building and establishing the value architecture, that is, the organization's assets, resources, and core competencies. Furthermore, the access to customers and business partners help achieve product-market fit and hence an appropriate value proposition that creates value for customers.

Status flows are 'flows of legitimacy, power, and recognition from high-status firms to lower-status firms' (see Padgett & Ansell, 1993; Gnyawali & Madhavan, 2001, p. 432). In the early-stage startup context, our interviewees confirmed that they gained trust and credibility from having a proven track record or having worked for high-status firms, consulting companies, or relevant business partners. Thus, status flows play the role of 'door openers' that facilitate access to other actors who would then provide information and resource flows.

In summary, we conclude that the founders' social networks play a pivotal role for business model development because of the information, resource, and status benefits these networks provide.

Our quantitative data supports the hypothesis that centrality of founders in their professional social networks (stemming from founders' career histories) has a significant positive influence on the success of their startups (measured as Series A funding success). Conversely, typical human capital factors such as previous work experience or specific skills were not significant. This finding is in line with previous research that showed that social capital has significantly greater impacts than human capital in explaining startup success (Stam *et al.*, 2014). Yet, we were able to show these effects in the unique context of early-stage Internet startups, which generally poses great challenges for researchers due to limited data availability (George & Bock, 2011).

Drawing meta-inferences – that is, the integration of findings across the qualitative and quantitative studies – is a critical and essential aspect of mixed-methods research (Venkatesh *et al.*, 2013). Here, both our research streams complemented each other well. The first part, the qualitative investigation through expert interviews, revealed that the founders themselves see their professional social networks as critically important for the development of the business model. To complement and expand on this rather subjective perception of the founders, we performed a subsequent quantitative statistical analysis of archival data, which was (implicitly) based on the more objective evaluation of investors. The quantitative analysis confirmed that better-connected founders have higher chances to obtain required follow-up funding for their startups. Combining the findings from both research streams, we conclude that startups with better-connected founders are more successful because the founders' professional social networks provide the required means (i.e., information, resource, and status benefits) to develop the business model in the early stage of the startup.

What are the implications from these findings for future conceptualization of and research on business models and startups? First, our findings provide new and unique insights into how young digital organizations dynamically develop their business models. Thus, we address a research gap identified by Al-Debei & Avison (2010) as well as George & Bock (2011) by adding how these business models actually emerge in practice to earlier research that primarily focused on what

comprises a business model. Specifically, this paper helps us understand business models in the empirical context of early-stage Internet startups as unstable and in flux. In this context, business models cannot be treated as a static fact but must be conceptualized as a dynamic structure that is emergent and constantly adapted over time.

Conversely, we found the founders to be a relatively stable component (of the startup and/or the business model). They are a central factor in explaining early-stage Internet startup success. This adds to previous research on the link between business model and firm performance that looked at more mature firms (Andries & Debackere, 2007; Zott & Amit, 2007). Further, these findings imply that an integration and synthesis of IS research on business models (typically focused on the organizational value proposition model) with entrepreneurial studies (typically focused on the person of the founder) will be fruitful to develop our knowledge of business models (recently also suggested by Veit *et al.*, 2014).

Second, the findings provide further evidence in a new context for the claim that external networks are a critically important resource for firms (on organizational level; e.g., Gnyawali & Madhavan, 2001; Canina *et al.*, 2012). In particular, we show how early-stage Internet startups leverage the information, resource, and status benefits their founders' networks provide to develop their business models. Notably, we found empirical evidence that the founders' social ties serve as antecedents to value network connections (e.g., to customers and suppliers). This finding certainly warrants further investigation of the link between individual-level and organizational-level networks in the context of business model and entrepreneurship research.

Finally, methodologically, this study is among the first to integrate qualitative methods and SNA methods in an IS research paper. In their recent review of mixed-method IS research published in top IS journals (AIS senior scholar basket, which includes the *Information Systems Journal*), Venkatesh *et al.* (2013) were unable to identify such an example, yet strongly and specifically advocated for this particular combination. As such, this paper may both provide an insightful account for researchers interested in the context of business models and IS entrepreneurship and also provide an example of how qualitative methods and SNA can be meaningfully integrated in IS research in general. We found the two methods mutually informing, and found it encouraging overall that similar results through different methodological tools result in the same empirical finding.

For Internet entrepreneurs and prospective founders, the findings suggest the critical importance of actively building professional social networks before creating a startup, and then nurturing and using these social networks extensively to develop a business model that adds value for the customer (rather than operating under the alternative assumption that 'it just takes the right idea'). Often – especially in the pay-it-forward culture of the Internet startup scene (Blank, 2011; Ready, 2012) – such networks provide 'free' (in monetary terms) critical resources for the business model/startups. 'Don't ask for money, ask for advice' (Calacanis, 2011) is a common mantra in the Internet startup scene. Increasing the social capital of a founder team, according to our findings, is a crucial mechanism to improve the likelihood of success of the startup. In terms of actionable advice to prospective founders, this would suggest getting a person with high social capital on board (e.g., a person with long professional experience, a well-connected angel investor, or an experienced serial entrepreneur). In that sense, both our participants as well as other practitioners suggest that the relationship between founder team and investor is (for both parties) not primarily a financial but a social arrangement (e.g., Dupree, 2012; Espinal, 2013; Kerpen, 2013).

For angel investors and other early investors in Internet startups – a group that could rapidly expand from an elite group to 'everybody' in the near future through crowdfunding and crowd investing/equity (Belleflamme *et al.*, 2014; Mollick, 2014) – the findings have implications for how to evaluate Internet startups. Investors should look beyond the business model in isolation and the 'human capital' competencies of the founders. They should study the networks founders bring to the table. That is, a startup with a good business idea will likely not succeed in securing required later-stage (Series A) funding if the founders lack the professional social capital required to develop a successful business model.

While our mixed-methods approach allowed us to provide rich insights for the reader, our study is limited in several ways. The first limitation is due to its empirical context. The Internet startup sector is a large and important sector (especially for IS researchers). However, this sector also has some unique characteristics that could lead to the findings not holding in other empirical contexts (or at least requiring additional tests if used for theorizing beyond the defined boundaries). Hence, we cannot and do not claim universal 'generalizability' of findings (see further Lee &

Baskerville, 2003). Still, we believe the findings do provide a starting point for further research and theorizing in other contexts as well.

Second, while we had sufficient samples to reach theoretical saturation in the key informant interviews and reach statistically valid results in the statistical test, the sample size is somewhat limited (17 founders in the qualitative part + 70 startups and their 145 founders in the quantitative study). While these numbers compare to other sample sizes used in SNA (Stam *et al.*, 2014), future work could enlarge the size of both empirical data considered. In the quantitative part, we studied exclusively Western (mainly U.S.-based) startups, which means we were not able to control for regional or cultural impacts. However, the results of the qualitative study, which included Chinese startups[6], indicate little differences between early-stage Internet startups in the Western world and in China. One difference we identified, however, is the stronger importance of status flow in China. This relates to the Chinese concept of 'guanxi', which describes the deeply embedded cultural importance of personal networks of influence (see further Davies *et al.*, 1995; Tsang, 1998; Park & Luo, 2001). Cross-industry or cross-cultural extension of the data set will provide further insights in this regard.

Third, we used 'natural' data from public sources. While using natural data prevents some of the problems and biases of survey-based research (e.g., natural data is generated through actual business performance in practice, not through the efforts of the researchers), it is restricted to data that are directly available and that typically are incomplete or may have other issues. For example, it appears that most Internet startups are listed in CrunchBase, but we had no control over startups not listed in CrunchBase, which makes any claim of a 'complete sample' problematic.

Finally, it should be clearly noted that we do not present (nor claim to present) a full theory of business models. Rather, we have developed five propositions and tested one resulting hypothesis. This is certainly useful for future theorizing, but will require further empirical studies of other contexts and the consideration of other factors to further develop such a theory. This study may provide a building block (Weick, 1995) for future theory developments.

[6] We thank the reviewers of this paper for pushing us to extend the scope of the qualitative study towards more geographic and cultural diversity.

CONCLUSION

Business models of early-stage Internet startups are highly dynamic and continually changing; in fact, the business model is only developed in this stage. Startup success is not a predetermined function of opportunity identification and the 'right idea'; rather, such success is the result of a very dynamic process of business model iteration and validation. The founders themselves play a crucial role in early-stage Internet startup success (considered in this study as the ability to achieve Series A funding), especially through their social capital. Using a mixed-method approach, we found strong support that startups with better-connected founders are more successful because the founders' professional social networks provide the required means (i.e., information, resource, and status benefits) to develop the business model in the early stage of the startup. We show this link based on 17 expert informant interviews with founders around the globe and the application of social network analysis to a unique sample of 70 startups and the professional networks of their 145 founders. While further empirical and theoretical work on business models is needed, we believe these findings provide an important piece in better understanding business model development and firm success in the context of early-stage Internet startups.

REFERENCES

Afuah, A. & Tucci, C. L. (2001) *Internet Business Models and Strategies: Text and Cases*. McGraw-Hill, Boston, MA, USA.

Ågerfalk, P. J. (2013) Embracing diversity through mixed methods research. *European Journal of Information Systems*, **22**, 251–256.

Al-Debei, M. M. & Avison, D. (2010) Developing a unified framework of the business model concept. *European Journal of Information Systems*, **19**, 359–376.

Andries, P. & Debackere, K. (2007) Adaptation and performance in new businesses: understanding the moderating effects of independence and industry. *Small Business Economics*, **29**, 81–99.

AngelList (2013) AngelList - Home. [WWW document]. URL http://angel.co (accessed 5 August 2014).

Ardichvili, A., Cardozo, R. & Ray, S. (2003) A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing*, **18**, 105–123.

Avison, D. & Fitzgerald, G. (2012) Reflections and opinions on 25 years with the ISJ. *Information Systems Journal*, **22**, 179–193.

Barney, J. B. (1986) Strategic factor markets: expectations, luck, and business strategy. *Management Science*, **32**, 1231–1241.

Bastian, M., Heymann, S. & Jacomy, M. (2009) Gephi: an open source software for exploring and manipulating networks. *Proceedings of the 3rd Int'l AAAI Conference on Weblogs and Social Media (ICWSM),* 17-20 May, San Jose, California.

Baum, J. A. C. & Silverman, B. S. (2004) Picking winners or building them? alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups. *Journal of Business Venturing*, **19**, 411–436.

Belleflamme, P., Lambert, T. & Schwienbacher, A. (2014) Crowdfunding: tapping the right crowd. *Journal of Business Venturing*, **29**, 585–609.

Bhagavatula, S., Elfring, T., van Tilburg, A. & van de Bunt, Gerhard G. (2010) How social and human capital influence opportunity recognition and resource mobilization in India's handloom industry. *Journal of Business Venturing*, **25**, 245–260.
Blank, S. (2005) *The Four Steps to the Epiphany: Successful Strategies for Products that Win*. Cafepress.com, San Mateo, CA, USA.
Blank, S. (2011) The pay-it-forward culture - Steve Blank on wordpress.com. [WWW document]. URL http://steveblank.com/2011/09/15/the-pay-it-forward-culture/ (accessed 5 August 2014).
Blank, S. & Dorf, B. (2012) *The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company*. K & S Ranch Press, Pescadero, CA, USA.
Bonacich, P. (1972) Factoring and weighting approaches to status scores and clique identification. *The Journal of Mathematical Sociology*, **2**, 113–120.
Borgatti, S. P. & Foster, P. C. (2003) The network paradigm in organizational research: a review and typology. *Journal of Management*, **29**, 991–1013.
Borgatti, S. P., Jones, C. & Everett, M. G. (1998) Network measures of social capital. *Connections*, **21**, 27–36.
Burkhart, T., Krumeich, J., Werth, D. & Loos, P. (2011) Analyzing the business model concept - a comprehensive classification of literature. *Proceedings of the 32nd International Conference on Information Systems,* 4-7 December, Shanghai, China.
Burton, M. D., Sørensen, J. B. & Beckman, C. M. (2002) Coming from good stock: career histories and new venture formation. In: *Research in the Sociology of Organizations*, Lounsbury, M., Ventresca, M. J. (eds), pp. 229–262. Emerald Group Publishing Ltd., Bingley, UK.
Calacanis, J. (2011) Startups - Cal Tech talk. [WWW document]. URL https://www.youtube.com/watch?v=ehDJB2K5Q6I (accessed 5 August 2014).
Canina, L., Palacios, D. & Devece, C. (2012) Management theories linking individual and organizational level analysis in entrepreneurship research. *International Entrepreneurship and Management Journal*, **8**, 271-284.
Charmaz, K. (2014) *Constructing Grounded Theory*. SAGE Publications, Thousand Oaks, CA, USA.
Chen, C. C., Greene, P. G. & Crick, A. (1998) Does Entrepreneurial Self-Efficacy Distinguish Entrepreneurs from Managers? *Journal of Business Venturing*, **13**, 295–316.
Chesbrough, H. (2010) Business model innovation: opportunities and barriers. *Long Range Planning*, **43**, 354–363.
Chesbrough, H. & Rosenbloom, R. S. (2002) The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, **11**, 529–555.
Chrisman, J. J. & McMullan, W. E. (2004) Outsider assistance as a knowledge resource for new venture survival. *Journal of Small Business Management*, **42**, 229–244.
Clark, B. (2011) Startup success: how 7 top angel investors do business. [WWW document]. URL http://mashable.com/2011/10/26/how-angels-invest/ (accessed 5 August 2014).
Cohen, W. M. & Levinthal, D. A. (1990) Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, **35**, 128–152.
Compeau, D. R. & Higgins, C. A. (1995) Computer self-efficacy: development of a measure and initial test. *MIS Quarterly*, **19**, 189–211.
Creswell, J. W. & Plano Clark, V. L. (2011) *Designing and Conducting Mixed Methods Research*. SAGE Publications, Los Angeles, CA, USA.
CrunchBase (2014) CrunchBase - Home. [WWW document]. URL http://www.crunchbase.com/ (accessed 5 August 2014).
Davies, H., Leung, Thomas K. P, Luk, Sherriff T. K & Wong, Y.-h. (1995) The benefits of “guanxi”: the value of relationships in developing the Chinese market. *Industrial Marketing Management*, **24**, 207–214.
Davila, A., Foster, G. & Gupta, M. (2003) Venture capital financing and the growth of startup firms. *Journal of Business Venturing*, **18**, 689–708.
Del Giudice, M. & Straub, D. (2011) IT and entrepreneurism: an on-again, off-again love affair or a marriage? *MIS Quarterly*, **35**, iii–vii.
Dupree, J. R. (2012) G-Startup – investing in startups is like marriage, say VCs at GMIC SV. [WWW document]. URL http://www.mobisights.com/2012/10/20/g-startup-investing-startups-marriage-vcs/7670 (accessed 5 August 2014).
Espinal, C. E. (2013) What tier is your investor (or what to look for in an investor)? [WWW document]. URL http://www.seedcamp.com/resources/what-tier-is-your-investor-or-what-to-look-for-in-an-investor (accessed 5 August 2014).
Ezzy, D. (2002) *Qualitative Analysis: Practice and Innovation*. Routledge, London, UK.
Friedkin, N. E. (1982) Information flow through strong and weak ties in intraorganizational social networks. *Social Networks*, **3**, 273–285.
Fruchterman, T. M. J. & Reingold, E. M. (1991) Graph drawing by force-directed placement. *Software: Practice and experience*, **21**, 1129–1164.
George, G. & Bock, A. J. (2011) The business model in practice and its implications for entrepreneurship research. *Entrepreneurship Theory and Practice*, **35**, 83–111.
Gnyawali, D. R. & Madhavan, R. (2001) Cooperative networks and competitive dynamics: a structural embeddedness perspective. *The Academy of Management Review*, **26**, 431–445.
Granovetter, M. S. (1985) Economic action and social structure: the problem of embeddedness. *The American Journal of Sociology*, **91**, 481–510.

Grover, V. & Saeed, K. A. (2004) Strategic orientation and performance of Internet-based businesses. *Information Systems Journal*, **14**, 23–42.
Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2010) *Multivariate Data Analysis - A Global Perspective*. Pearson, Upper Saddle River, NJ, USA.
Harrigan, K. R. (1986) *Managing for Joint Venture Success*. Lexington Books, Lexington, MA, USA.
Hedman, J. & Kalling, T. (2003) The business model concept: theoretical underpinnings and empirical illustrations. *European Journal of Information Systems*, **12**, 49–59.
Helfat, C. E. & Peteraf, M. A. (2003) The dynamic resource-based view: capability lifecycles. *Strategic Management Journal*, **24**, 997–1010.
Hsieh, H.-F. & Shannon, S. E. (2005) Three approaches to qualitative content analysis. *Qualitative Health Research*, **15**, 1277–1288.
Kerpen, D. (2013) 3 ways angel investors can help you (a lot). [WWW document]. URL http://www.inc.com/dave-kerpen/angel-seed-funding-success.html (accessed 5 August 2014).
Kollmann, T. (2006) What is e-Entrepreneurship? fundamentals of company founding in the net economy. *International Journal of Technology Management*, **33**, 322–340.
Krumeich, J., Burkhart, T., Werth, D. & Loos, P. (2012) Towards a component-based description of business models: a state-of-the-art analysis. *Proceedings of the 17th Americas Conference on Information Systems,* August 9-12, Seattle, Washington.
Lambert, S. C. & Davidson, R. A. (2013) Applications of the business model in studies of enterprise success, innovation and classification: an analysis of empirical research from 1996 to 2010. *European Management Journal*, **31**, 668–681.
Lazear, E. P. (2004) Balanced skills and entrepreneurship. *American Economic Review*, **94**, 208–211.
Lee, A. S. & Baskerville, R. L. (2003) Generalizing generalizability in information systems research. *Information Systems Research*, **14**, 221–243.
Lewis, N. (2011) Business angels; its not about the product! [WWW document]. URL http://www.ibusinessangel.com/2011/06/business-angels-its-not-about-the-product/ (accessed 5 August 2014).
Lichtman, M. (2013) *Qualitative Research in Education: A User's Guide*. SAGE Publications, Los Angeles, CA, USA.
MacInnes, I. (2005) Dynamic business model framework for emerging technologies. *International Journal of Services Technology and Management*, **6**, 3–19.
Madhavan, R., Koka, B. R. & Prescott, J. E. (1998) Networks in transition: how industry events (re)shape interfirm relationships. *Strategic Management Journal*, **19**, 439–459.
McGrath, R. G. (2010) Business models: a discovery driven approach. *Long Range Planning*, **43**, 247–261.
McKnight, L. W., Vaaler, P. M. & Katz, R. L. (2002) *Creative Destruction: Business Survival Strategies in the Global Internet Economy*. MIT Press, Cambridge, MA, USA.
Mingers, J. (2001) Combining IS research methods: towards a pluralist methodology. *Information Systems Research*, **12**, 240.
Mingers, J. (2003) The paucity of multimethod research: a review of the information systems literature. *Information Systems Journal*, **13**, 233–249.
Mingers, J. & Brocklesby, J. (1997) Multimethodology: towards a framework for mixing methodologies. *Omega*, **25**, 489–509.
Mollick, E. (2014) The dynamics of crowdfunding: an exploratory study. *Journal of Business Venturing*, **29**, 1–16.
Morris, M., Schindehutte, M. & Allen, J. (2005) The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, **58**, 726–735.
Morris, M. H., Schindehutte, M., Richardson, M. & Allen, J. (2006) Is the business model a useful strategic concept? conceptual, theoretical, and empirical insights. *Journal of Small Business Strategy*, **17**, 27–50.
Muzyka, D., Birley, S. & Leleux, B. (1996) Trade-offs in the investment decisions of European venture capitalists. *Journal of Business Venturing*, **11**, 273–287.
Myers, M. D. (2013) *Qualitative Research in Business & Management*. SAGE Publications, London, UK.
Nahapiet, J. & Ghoshal, S. (1998) Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, **23**, 242–266.
Nivi, B. (2008) Who makes the best introductions to investors? [WWW document]. URL http://venturehacks.com/articles/introductions (accessed 5 August 2014).
Nonaka, I. (1994) A dynamic theory of organizational knowledge creation. *Organization Science*, **5**, 14–37.
NVCA (2013) National Venture Capital Association yearbook 2013. [WWW document]. URL http://www.nvca.org/index.php?option=com_content&view=article&id=257&Itemid=103 (accessed 5 August 2014).
Osterwalder, A., Pigneur, Y., Bernarda, G. & Smith, A. (2014) *Value Proposition Design: How to Create Products and Services Customers Want*. Wiley.
Osterwalder, A., Pigneur, Y. & Clark, T. (2010) *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. Wiley, Hoboken, NJ, USA.
Osterwalder, A., Pigneur, Y. & Tucci, C. L. (2005) Clarifying business models: origins, present, and future of the concept. *Communications of the Association for Information Systems*, **16**.
Padgett, J. F. & Ansell, C. K. (1993) Robust action and the rise of the medici, 1400-1434. *American Journal of Sociology*, **98**, 1259–1319.

Park, S. H. & Luo, Y. (2001) Guanxi and organizational dynamics: organizational networking in Chinese firms. *Strategic Management Journal*, **22**, 455–477.
Patterson, I. & Arnold, C. (2010) Seed capital from angel investors: Dave McClure, founder, 500 Startups (part 7). [WWW document]. URL http://www.sramanamitra.com/2010/10/18/seed-capital-from-angel-investors-dave-mcclure-the-founder-500-startups-part-7/ (accessed 5 August 2014).
Poole, G. (2001) The riddle of the abandoned shopping cart. *The Industry Standard*, **December–January**, 77–82.
Porter, M. E. (1985) *Competitive Advantage*. Free Press, New York, NY, USA.
Ready, K. (2012) Paying it forward: Silicon Valley's open secret to success. [WWW document]. URL http://www.forbes.com/sites/kevinready/2012/08/23/paying-it-forward-silicon-valleys-open-secret-to-success/ (accessed 5 August 2014).
Ries, E. (2011) *The Lean Startup: How Constant Innovation Creates Radically Successful Businesses*. Portfolio Penguin, London, UK.
SEC (2013) Filings & forms. [WWW document]. URL https://www.sec.gov/edgar.shtml (accessed 5 August 2014).
Serarois-Tarrés, C., Padilla-Meléndez, A. & del Aguila-Obra, A. R. (2006) The influence of entrepreneur characteristics on the success of pure dot.com firms. *International Journal of Technology Management*, **33**, 373–388.
Shadish, W. R., Cook, T. D. & Campbe, D. T. (2001) *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Wadsworth Publishing.
Shane, S. & Venkataraman, S. (2000) The promise of entrepreneurship as a field of research. *The Academy of Management Review*, **25**, 217–226.
Shirky, C. (2008) *Here Comes Everybody: The Power of Organizing Without Organizations*. Penguin, London, UK.
Silverman, D. (2011) *Interpreting Qualitative Data: A Guide to the Principles of Qualitative Research*. SAGE Publications, Los Angeles, CA, USA.
Stam, W., Arzlanian, S. & Elfring, T. (2014) Social capital of entrepreneurs and small firm performance: a meta-analysis of contextual and methodological moderators. *Journal of Business Venturing*, **29**, 152–173.
Taylor, C. (2012) Study: more than 1,000 seed-funded startups are destined to be 'orphaned' at the Series A stage. [WWW document]. URL http://techcrunch.com/2012/12/19/study-more-than-1000-seed-funded-startups-are-destined-to-be-orphaned-at-the-series-a-stage/ (accessed 5 August 2014).
Teddlie, C. & Tashakkori, A. (2009) *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences*. SAGE Publications, Los Angeles, CA, USA.
Teece, D. J. (2010) Business models, business strategy and innovation. *Long Range Planning*, **43**, 172–194.
Teece, D. J., Pisano, G. & Shuen, A. (1997) Dynamic capabilities and strategic management. *Strategic Management Journal*, **18**, 509–533.
Trimi, S. & Berbegal-Mirabent, J. (2012) Business model innovation in entrepreneurship. *International Entrepreneurship and Management Journal*, **8**, 449–465.
Tsang, E. W. K. (1998) Can guanxi be a source of sustained competitive advantage for doing business in China? *The Academy of Management Executive (1993-2005)*, **12**, 64–73.
Unger, J. M., Rauch, A., Frese, M. & Rosenbusch, N. (2011) Human capital and entrepreneurial success: a meta-analytical review. *Journal of Business Venturing*, **26**, 341–358.
Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Kundisch, D., Leimeister, J. M., Loos, P. & Spann Martin (2014) Business models – an information systems research agenda. *Business & Information Systems Engineering*, **6**, 45–53.
Venkatesh, V., Brown, S. A. & Bala, H. (2013) Bridging the qualitative-quantitative divide: guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, **37**, 21–54.
Wasserman, S. & Faust, K. (1994) *Social Network Analysis: Methods and Applications*. Cambridge University Press, Cambridge, UK.
Weick, K. E. (1995) What theory is not, theorizing is. *Administrative Science Quarterly*, **40**, 385–390.
Wernerfelt, B. (1984) A resource-based view of the firm. *Strategic Management Journal*, **5**, 171–180.
Wertz, B. (2013) The best way to approach investors: four tips. [WWW document]. URL http://versiononeventures.com/best-way-approach-investors-four-tips/ (accessed 5 August 2014).
Whetten, D. A. (1989) What constitutes a theoretical contribution? *Academy of Management Review*, **14**, 490–495.
Zahra, S. A. & George, G. (2002) Absorptive capacity: a review, reconceptualization, and extension. *Academy of Management Review*, **27**, 185–203.
Zhao, H., Seibert, S. E. & Lumpkin, G. T. (2010) The relationship of personality to entrepreneurial intentions and performance: a meta-analytic review. *Journal of Management*, **36**, 381–404.
Zott, C. & Amit, R. (2007) Business model design and the performance of entrepreneurial firms. *Organization Science*, **18**, 181–199.
Zott, C., Amit, R. & Massa, L. (2011) The business model: recent developments and future research. *Journal of Management*, **37**, 1019–1042.

APPENDIX A: OVERVIEW OF INTERVIEW PARTNERS

Name	Founded in	Funding	Country	Business context
Investor A	-	-	Germany	-
Founder A	2010	Seed	USA	Customer service
Founder B	2010	Seed	Germany	Mobile apps
Founder C	2011	Angel (2 rounds)	Germany	Web business
Founder D	2008	Series A	Germany	Social network
Founder E	2013	Seed	Germany	Social advertisement
Founder F	2011	Seed (2 rounds)	Germany	Automotive mobile apps
Founder G	2012	Bootstrapped	USA	Business intelligence
Founder H	2010	Angel	Germany	News
Founder I	2012	Seed	Germany	Social media
Founder J	2013	Seed	USA	E-Commerce
Founder K	2012	Bootstrapped	USA	Web business
Founder L	2013	Seed	China	Web business
Founder M	2013	Accelerator	China	Mobile business
Founder N	2013	Angel	China	Web business
Founder O	2013	Seed	China	Mobile games
Founder P	2012	Seed	China	Web business

APPENDIX B: INTERVIEW GUIDELINE (KEY INFORMANTS STUDY)

Interview topic	Question
Founding event	○ Opening question: Please describe how (and when) the new/last business was founded? ○ When was your new/last business founded? ○ How many co-founders (if any) were there when the startup was founded?
Funding	○ Opening question: How has the business been funded over time? ○ Did you receive angel investment? When? Optional: How much? From whom? ○ Did you receive seed funding? When? Optional: How much? From whom? ○ Did you receive Series A funding? When? Optional: How much? From whom? ○ Did you receive further funding other than angel, seed, and Series A funding? Optional: How much? From whom?
Team constellation (optional)	○ Have the founding team members changed over time? Did founders leave the initial team or did you add additional team members as co-founders (not as regular employees)? ○ Is there a 'lead entrepreneur' – a single founder who had the business idea in the first place and then searched for suitable co-founders? ○ Are all founders equal – for example, gain-risk-share, personal investments into the business, etc.?
Business model (underlying dimensions and their relative importance)	○ In your opinion, what are the business model characteristics of Internet startups? ○ What makes these business models distinctive? ○ How do these business models differ from other industries, such as traditional technology, biotech, and so on? ○ How do you see the development of an idea over time? Does the idea often stay the same or does it change? ○ How do you see the development of the business model of your startup? Was it static or did it change dynamically, evolving over time? (Note that some see only the finance model as 'business' model.) ○ Please provide some more details about how your business model evolved over time? ○ Which business model elements were present (fixed) in the beginning and stable over time, if any? ○ Would you say that your entire business model changed over time, or that only some underlying elements changed? ○ Is there a well-thought-out strategy behind how you evolve your business model, or do you follow more of a trial-and error approach?

APPENDIX B: CONT.

Interview Topic	Question
Business model (underlying dimensions and their relative importance)	○ Are there some cornerstones (core beliefs) in the strategic orientation of your business model – for example, a strong focus on innovation vs. operational efficiency? Do these cornerstones change over time? ○ How to you do the terms 'business idea', 'strategy', and 'business model' relate to each other? ○ If you need to balance strategic thinking with the ability to adapt quickly, which would you say is more important for a founder in an early-stage startup? ○ Would you consider the founders (yourself) to be an inherent element of the business model (e.g., a critical resource) or are the founders not part of the business model but instead its creators and enablers? Why? ○ Generally speaking, what do you see as the role of the founder in the early stage of a startup with regards to the business model?
Founder's network activities	○ What role does your social environment and social network play – that is, your relationships with friends, former colleagues, and other contacts (social capital)? Do you actively manage and grow your social networks? How? ○ Support from strong ties: Did you receive any support from your spouse/life partner, parents, friends, and/or relatives during your founding activity? What kind of support? ○ Support from weak ties: Did you receive any support from business partners, acquaintances, former employers, and former co-workers? What kind of support? ○ Looking back, who are the six most important people who supported you in building up your business?

Founders' social capital, connectedness, and network benefits	○ Opening question: What is more important in founding a successful startup: human capital (the things you can do by yourself) or social capital (the people you know that can do things for you)? Why?
	○ Have you specifically observed/benefitted from your network, contacts, etc.?
	  ○ Resource flow: e.g., former colleagues who joined your startup as co-founders or regular employees, etc.
	  ○ Information flow: e.g., 'insider' knowledge; early access to relevant information for your business (industry trends, new products to be launched, etc.)
	  ○ Status flow: e.g., increased credibility in the business context; advance of trust; etc.

APPENDIX C: DATA COLLECTION AND CORRECTION FOR QUANTITATIVE STUDY

We used two primary data sources for our research effort: CrunchBase, a free public database that provides structured profiles on technology startups, including detailed funding information (CrunchBase, 2014); and a large business online social networking site for more detailed information on founders as well as turnover information between companies. In addition to these two databases, we referred to the startup platform AngelList (AngelList, 2013) and to the 'About Us' pages of the startups we included in the study to gather additional information on the number of founders. Finally, we also used press mentions and the public database of the U.S. Securities and Exchange Commission (SEC, 2013) to validate the funding information from CrunchBase. Table 2 is an overview of the data sources and the type of data collected.

Table 2. Overview of data sources and types

Data source	Type of data	Purpose of data
CrunchBase	Structured profiles of technology startups, including detailed funding information	Sample selection
Large business online social network	More detailed information on founders, especially their employment history, as well as turnover between companies.	Supplement, validation
AngelList	Information on the number of founders.	Supplement
U.S. Securities and Exchange Commission	Funding information	Validation

First, we needed to identify a suitable sample of early-stage Internet startups for our analyses. We selected all startups in the CrunchBase database that belonged to the category 'Consumer Web', were U.S.-based, and received seed funding in 2011. This resulted in a relatively homogenous first set of 103 startups and their 188 founders. Next, we referred to the business online social network, where we searched manually for our founders' profiles. We were able to find profiles for 94 per cent; the other 6 per cent did not have a profile. Unfortunately, not all the profiles included complete resumes, so we had to exclude those founders and their related startups from our subsequent analyses. Thus, we ended up with a final set of 70 startups and their 145 founders. The founders we removed from the data set showed

no patterns other than the fact that they had not completely filled out their profiles. As we were only interested in their job histories, we assumed they were missing completely at random (MCAR).

We coded most of the information from the founder's profiles into an Excel workbook, including demographics, educational background, and specifically prior employers (see Appendix F below for details). For the startups, we used the funding information to differentiate successful and unsuccessful startups using a dichotomous (dummy) variable based on whether they had received Series A funding.

Second, we created our industry network. The business online social network provided insightful statistics on turnover between companies. For every company, there was a statistic of the top 5 companies from which people came and where they went, based on its vast database of people and their individual career histories. The basic idea was to follow those inbound and outbound ties between companies and eventually capture a network of turnover relationships. However, this direct approach would have had the disadvantage of collecting only the largest (top 5) turnover relationships while neglecting all others. We circumvented this limitation by beginning the process not with a single company but rather with a large set of companies derived from CrunchBase. We followed a 3-step 'snowball'-approach: First, we downloaded all companies from CrunchBase (set of 87,257) and tried to match them with companies present on the business online social network, using its API. This resulted in 23,659 companies. In Step 2, we accessed the company profile page on the business network of every company in the CrunchBase set, and followed all inbound and outbound turnover connections of these companies. As the third step, we accessed all new companies that resulted from step 2 and again followed their turnover relationships. Theoretically, this should result in 10 more companies for every company. Practically, the number of new companies converged quickly. We halted the process after repeating step 3 twice, resulting in a set of 29,419 companies. Some 95 per cent of these companies were connected in one giant component, while the remaining 5 per cent were distributed across small, disconnected islands of a maximum of 8 companies each. We removed these otherwise unconnected companies, as they would not influence the calculation of our network attributes. This resulted in a final industry network of 27,857 companies that were connected to each other by 85,767 turnover relationships.

Third, we integrated our 70 startups into the industry network. Similar to the process described above, we used the turnover information of the founders to connect startups with existing companies in the industry network. For instance, if a founder had worked previously for IBM, Yahoo, and SAP, ties were added from the founder's startup to those three companies. We applied social network analysis methods to investigate and differentiate startups based on their relative position in the industry network (see Appendix F).

APPENDIX D: TRANSFORMATION OF EIGENVECTOR CENTRALITY

Before transformation, the Eigenvector Centrality (EC) variable showed significant deviations for skewness and kurtosis (see Table 3), as depicted in the left Q-Q plot in Figure 1 below. In addition, the modified Kolmogorov-Smirnov test of normality shows that the data significantly deviates from a normal distribution.

Table 3. Test of Normality

	Skewness		**Kurtosis**		**Test of Normality**[a]	
Variable	Statistic	z value	Statistic	z value	Statistic	Significant.
Eigenvector Centrality (EC)	2.011	7.007	4.105	7.253	.239	.000
EC after LN transformation	-.048	-.167	-.958	-1.693	.083	.200[b]

[a] Results are shown for the modified Kolmogorov-Smirnov test (Lilliefors significance correction). In addition, the Shapiro-Wilk test was also not significant (p=.065).

[b] Lower bound of true significance

After transformation using the natural logarithm (LN), the data were found to be normally distributed, as confirmed by the test of normality and the second Q-Q plot (see Hair *et al.*, 2010 for a discussion of variable transformations).

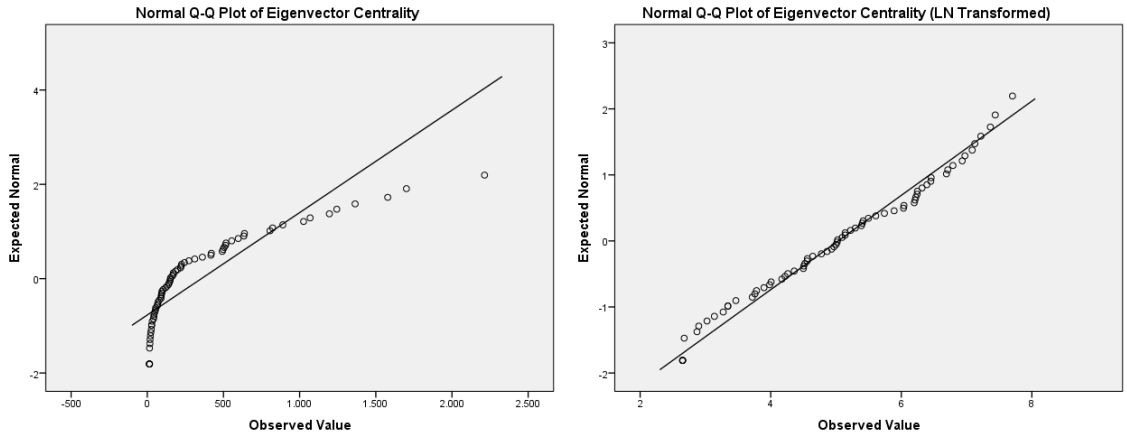
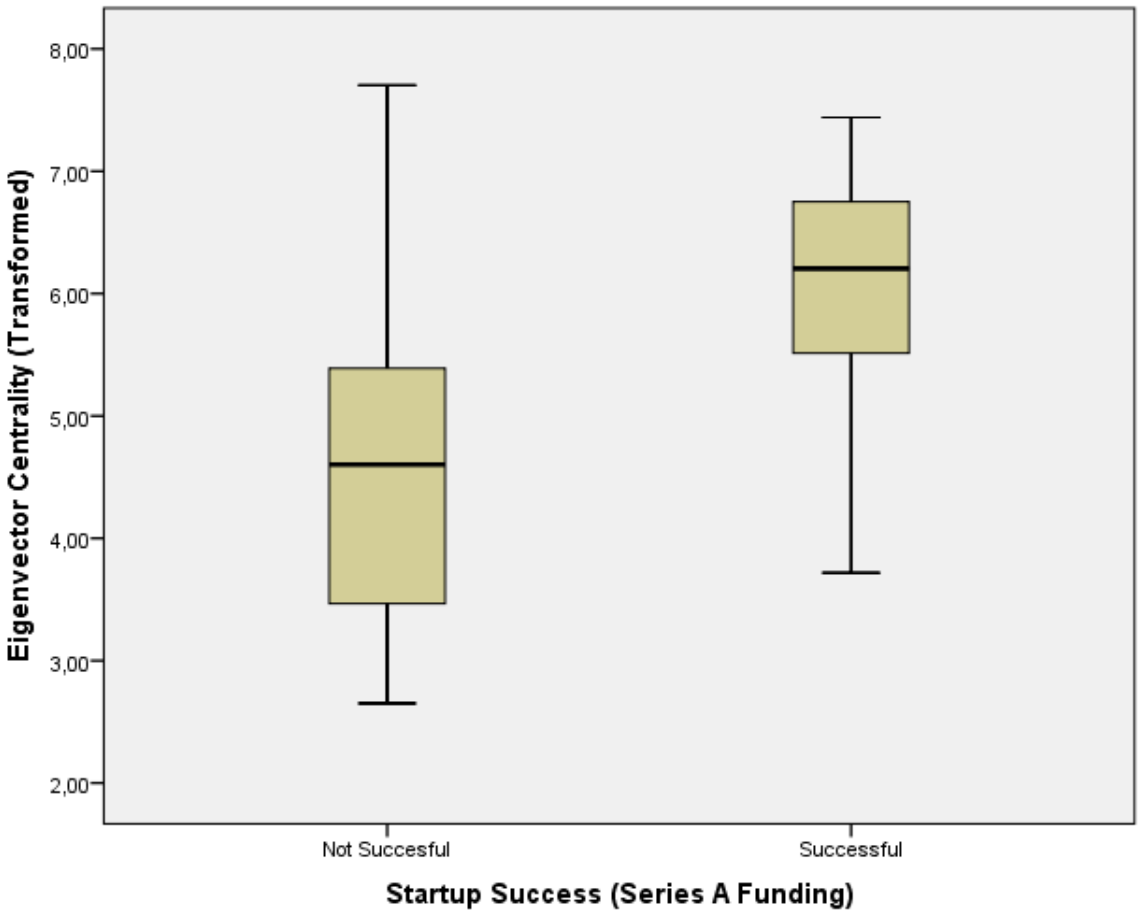


Figure 1. Q-Q Plot Before and After Data Transformation

APPENDIX E: EIGENVECTOR CENTRALITY OF SUCCESSFUL VS. UNSUCCESSFUL STARTUP GROUPS



APPENDIX F: INDUSTRY CONTEXT (NETWORK GRAPH)

The Fruchterman-Reingold algorithm (Fruchterman & Reingold, 1991) has been applied to calculate the spatial positions of nodes in the turnover industry network. Fruchterman-Reingold is a force-directed algorithm that considers a repulsive force between any two nodes. This force causes well-connected nodes of a network to attract each other, and places nodes with high centrality in more central positions. Consequently, the structural layout of the graph reflects the proximity and cohesion of nodes in the turnover network (see Figure 2 below). Black circles (+) represent the successful and white circles (-) the unsuccessful startups in our sample. Black squares represent the most central companies in the network, including IBM, Microsoft, Google, and SAP.

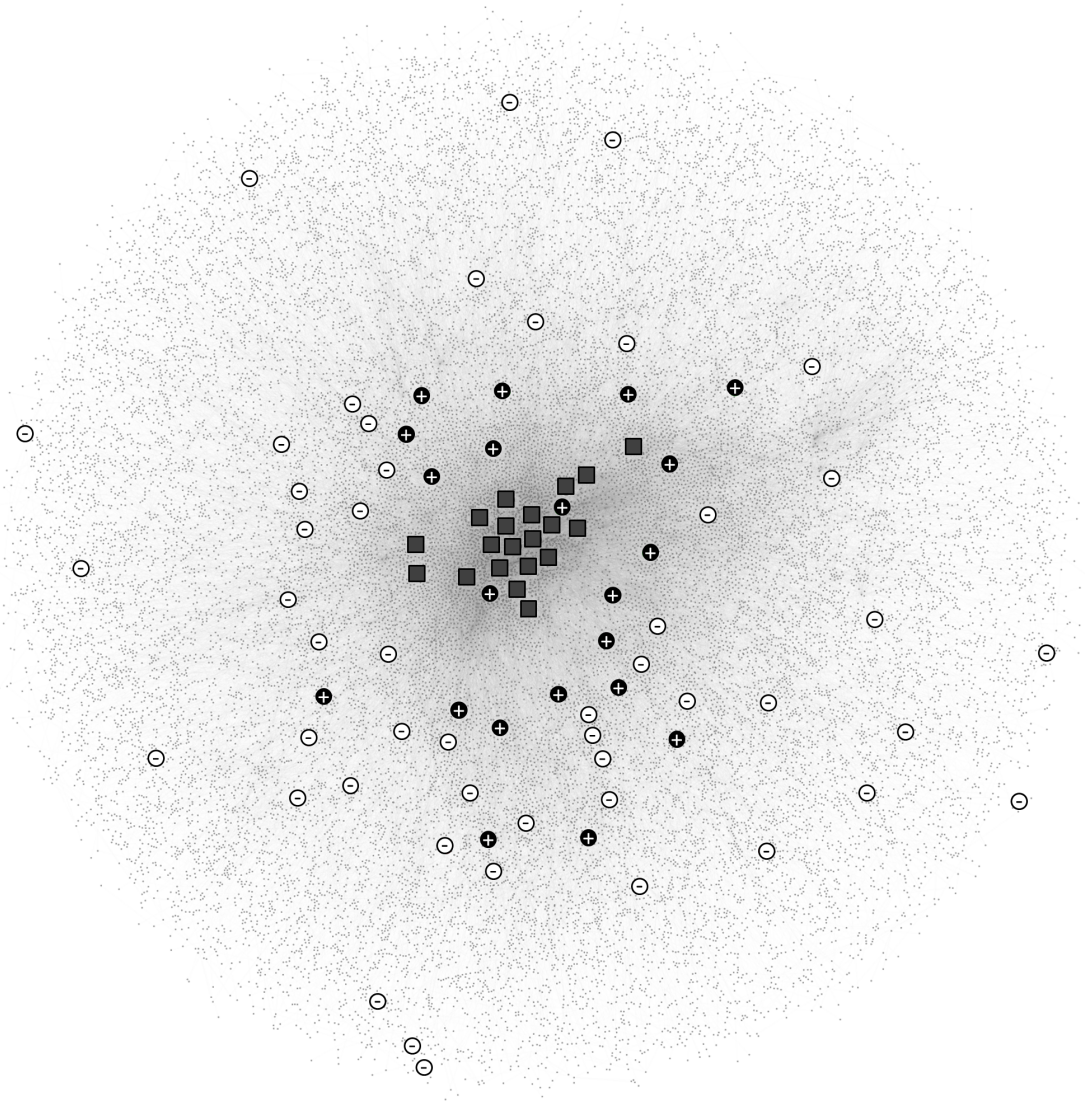


Figure 2. Industry network