Mobilizing Resources in Constrained Environments: A Study of Technology Social Ventures

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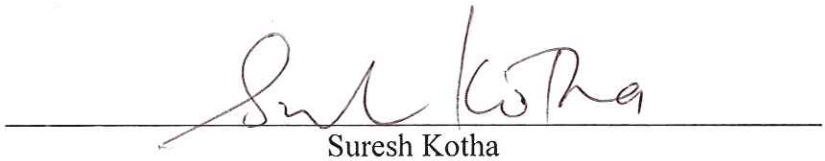

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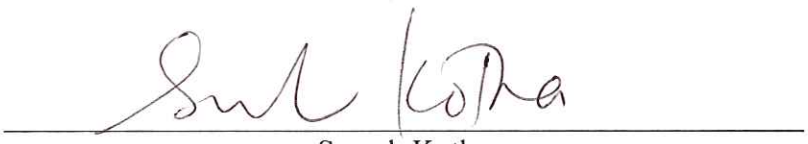

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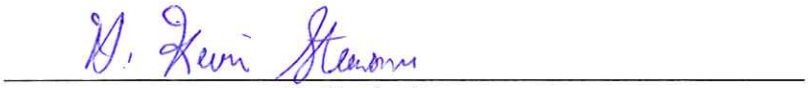

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Abstract

Mobilizing Resources in Constrained Environments:
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Resource mobilization is of fundamental importance to all startup ventures. In particular, ventures that operate in areas with insufficient access to basic healthcare, education, economic development, or human rights, often face severe resource constraints, because of limited access to seed funding from philanthropic and capital markets. In my dissertation I address two broad questions. First, how do entrepreneurs mobilize resources in resource-constrained environments? Second, how does the form of resource mobilization affect venture scalability? Based on the social entrepreneurship literature and theories of resource mobilization, I undertook an exploratory three-year field study of eight technology ventures within a social venture incubator to examine how social ventures mobilize resources in the absence of external sources of funding or a lack of institutional support. Using bricolage and resource-seeking as two contrasting modes of resource mobilization, I

developed a model to explain how technology social ventures mobilize resources, and attract and maintain users in order to sustain growth. This model suggests that the source of funding and level of institutional support (regulatory, technology, political stability, and human development) will predict whether a venture uses bricolage or resource-seeking to mobilize resources. The model also suggests that the use of collective agency will moderate the relationship between resource-mobilization and venture scalability. I test the model on a sample of 202 technology social ventures operating in 48 countries, in one of five sectors: health, economic development, equality, education and environment.

First, I found that bricolage can help a venture start up in penurious environments that lack external sources of funding or institutional support. However, bricolage is insufficient for venture growth. I found that a higher level of collective bricolage—the participation of external actors—is required to scale the venture to new markets. This dissertation contributes to the literature in technology entrepreneurship and social entrepreneurship by explaining how technology social ventures mobilize resources and create scalable social innovations in penurious environments despite a scarcity of funding and institutional support.

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I have looked forward to this moment from the first time I tentatively considered a doctoral program, and I feel tremendous joy in writing these words. Thank you for reading this dissertation.

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DEDICATION

For my grandmother Olive. Mama, your dreams live on.

Chapter 1: Introduction and Overview

1.1 Motivation

Technology has the potential to transform human development. As inequalities in education, healthcare, human rights, and economic development continue to prevail, entrepreneurs around the world are beginning to address social problems through technology. The 2005 World Summit on the Information Society, attended by representatives from 177 countries, concluded that the key to creating robust, scalable solutions were technology ventures that addressed social issues in a financially sustainable manner. At the same time, the summit acknowledged the difficulty of addressing social problems because of severe market failures.

From an economic perspective, market failures either occur when the production or allocation of goods and services by a market is sub-optimal or when the resulting allocation of goods and services is inconsistent with values of justice or fairness (Bator, 1958). Social ventures, such as traditional startups, leverage market principles to address these failures, with one important difference: they emphasize social impact over financial wealth creation (Dees, 1998).

Social entrepreneurship is a term used to describe innovative solutions to social problems through entrepreneurial activity. Nonprofits and nongovernmental organizations (NGOs), foundations, governments, individuals, and corporations have begun to promote, fund, and advise social entrepreneurs around the world.

Organizations such as Ashoka, the Skoll Foundation, the Omidyar Network, the Schwab Foundation for Social Entrepreneurs, Echoing Green, and the Draper Richards Foundation, among others, identify and invest in social ventures around the country and the globe. A growing number of colleges and universities have also established business school or public affairs programs and courses that focus on educating and training social entrepreneurs (Aspen Institute, 2006). For example, Stanford, Harvard, and Duke Universities now offer social entrepreneurship programs at the graduate level. Social ventures occur in a diverse array of organizational forms, from nonprofit organizations that involve some kind of earned income activity (e.g., Manchester's Craftsmen's Guild) and for-profit companies that have a social purpose (e.g., the Grameen Bank) to joint-venture collaborations between nonprofit and for-profit organizations (e.g., Pioneer Human Services, Boeing) (cf. Bowles, 1995; Dees & Anderson, 2003; Sagawa, 2000).

One question that often arises in the literature and in the practitioner field is how do social ventures mobilize resources when access to philanthropic and capital markets is limited? From inner-city neighborhoods in the U.S. (e.g., Porter, 1995) to small villages in Brazil and India (Bornstein, 2004; Peredo & McLean, 2003), scholars have examined the resource-constrained environments in which social ventures operate and the challenges of mobilizing resources (Mair & Marti, 2008). Indeed, resource mobilization is fundamentally important to all startup ventures (Hsu, 2008; Shane 2003). The acquisition and combination of material, labor, and skills is essential to creating new products and services (Schumpeter, 1934; Shane

& Venkatraman, 2000). Resource mobilization allows ventures to survive, grow, and become profitable (Bruderl et al., 1992; Pfeffer & Salancik, 1978), and can even lead to competitive advantage (Penrose, 1959; Wernerfelt, 1984).

However, while the research literature on entrepreneurship has focused on how ventures mobilize resources through external sources of financing (e.g., Dushinitsky & Lenox, 2005; Sapienza & Gupta, 1994), it has yet to address how resources may be mobilized in penurious environments without basic access to literacy, medical care, and even human rights. Yet these are the very environments in which social ventures seek to operate (Mair & Marti, 2008; Sarasvathy, 2006). As such, scholars have lamented that the failure of entrepreneurship research to address social-wealth creation as well as economic-wealth creation poses a key research gap (Venkatraman, 1997:135).

1.2 Research Question

In this dissertation I address two broad questions. First, *how do entrepreneurs mobilize resources in resource constrained environments?* Second, *how does the form of resource mobilization affect venture scalability?* Understanding how ventures mobilize resources in constrained environments could form a key contribution to social entrepreneurship research, while helping to explain the link between social and economic wealth creation (Mair & Marti, 2006).

Social entrepreneurship literature has already identified the constraining and enabling roles played by regulatory institutions in the development of social

enterprise. This stream focuses on internal governance mechanisms and external regulatory actions that influence social entrepreneurship at the level of individuals, ventures, and communities (Bayliss, 2004; Korosec & Berman, 2004; Wallace, 1999). A more recent addition to this stream identifies social ventures that occur in the absence of supporting institutions, thereby changing public perceptions and creating new markets in the process (Dean & McMullen, 2006; Sarasvathy, 2006). While these streams of research clearly identify conditions under which social ventures operate, they have not addressed *how* such social ventures mobilize resources and create innovative products in the face of severe resource constraints.

Since startup technology ventures often mobilize resources and innovate, despite facing resource constraints, technology entrepreneurship literature may offer some light on this emerging area. Technology ventures are often spotlighted in the entrepreneurship and management literature not only for their high-growth potential but also their ability to effectively mobilize resources and create innovative products (Shane, 2003). So far, technology entrepreneurship research has mainly focused on the relationship between the startup venture's access to resources and venture performance. Founder access to resources make it likely for ventures to gain financing (Shane & Cable, 2002), create innovative products (Brown & Eisenhardt, 1995; Hargadon & Sutton, 1997), and complete an initial-public offering (Nelson, 2003). One assumption implicit in this research is that the entrepreneur discovers a potentially large *paying* market—a group of people willing to pay for the products or services created by the startup venture (Kirzner,

1997). The existence of a potentially large market is a necessary condition to gain access to venture capital funding (Gompers, 1995), corporate venture capital funding (Dushintsky & Lenox, 2005), or institutional financing (Lerner, 2002). Based on the promise of capturing paying customers in a growing market, technology startup ventures exchange company equity for financing, and for acquiring technologies through patents (Griliches, 1990; Hsu & Lim, 2005) or licensing (Mowery, Oxley, & Silverman, 1998).

Little research exists on how ventures originate, develop, and grow when the *paying* market assumption does not hold. Even so, many entrepreneurs continue to pursue new challenges, despite their inability or refusal to attract the resources such challenges seem to demand (Baker, Miner, & Eesely, 2003; MacMillan & McGrath, 1997; Mahoney & Michael, 2005). The peculiarity of social ventures is that the product or service is created to address a social need, yet the target demographic lacks the ability to pay market rates. Often, customers cannot pay enough to even recoup the costs of developing the product or service. Consequently, social ventures must often mobilize resources under conditions which are unattractive to institutional financing or venture capitalists. Sometimes these ventures survive by exploiting opportunities despite resource constraints. The question thus remains: How do social ventures originate, develop and grow when a social need exists but the target demographic does not have the ability to pay?

1.3 Theoretical Lens

Our understanding of the process underlying social entrepreneurship is at an early stage. Little theory exists to guide or test questions of resource mobilization from the perspective of the entrepreneur operating in a resource-constrained environment. As a result, I will draw upon two theoretical lenses from organization theory and strategic management—resource-dependence theory (Pfeffer & Salancik, 1978) and the resource based view of the firm (Penrose, 1959). From resource-dependence theory I will develop the "resource-seeking" construct. From the resource based view I will develop the "bricolage" construct. I will then contrast resource-seeking and bricolage as two alternative modes of resource-mobilization, to explain how entrepreneurs mobilize resources when faced with resource constraints.

Resource-dependence theory offers one possible explanation for how firms mobilize resources. According to this theory, the key to organizational survival lies in its ability to acquire and maintain resources from the environment. In order to minimize dependence on an uncertain environment, organizations must seek resources from different providers and adapt to the changing environment at hand. Resource-dependence theory suggests that when faced with an environmental constraint, social ventures must attempt to secure resources through debt, equity, or grants from a variety of providers. Often resource-seeking behavior is embodied in the form of a business-plan or grant proposal that can be adapted to the funding environment. Entrepreneurs use the plan to explain their business to potential

resource providers such as venture capitalists and formal institutions such banks and small-business development organizations. Such business plans specify how resources will be used to exploit the given opportunity identified by the entrepreneur (Castrogiovanni, 1996; Delmar & Shane, 2003).

There are two disadvantages to the resource-dependence approach to mobilizing resources. First, a dependence on external providers can result in changing mission and organizational goals (Austin et al., 2005). Second, resources are assumed to remain objective and definable, independent of the specific organization embedded in the resource environment. In other words, firm resource scarcity can only be addressed by addressing the environment surrounding the firm. Thus, from the resource-seeking perspective, entrepreneurs faced with a penurious environment can either choose to ignore new opportunities or to disband the venture. Still, ventures often start and survive despite severe objective resource-constraints in penurious environments (Kodithuwakku & Rosa, 2002; Mahoney & Michael, 2005) and without any form of business plan (Sarasvathy, 2001).

The resource-based theory of the firm (Penrose, 1959) provides an alternative perspective to help explain how firms may develop, grow, and flourish in resource-constrained environments. It states that each firm is unique in its idiosyncratic relation to the resource environment. Firm differences arise because different firms elicit different services from the same set of objective resources (Penrose, 1959; Wernerfelt, 1984). A resource which may seem worthless to one firm can be perceived as valuable by another. Thus, firms can intentionally make

do by using existing resources that are available for free or cheaply since others judge them to be useless (junk) or substandard (Baker & Nelson, 2005). This practice of using combinations of existing resources for new purposes is described as bricolage (Baker & Nelson, 2005; Levi-Strauss, 1966).

Bricolage is defined as "making do with current resources, and creating new products or services from tools and materials at hand" (Baker & Nelson, 2005). Armed with knowledge of the resources at hand, firms can engage in bricolage and embrace new problems and opportunities. The process of combining resources serves as a mechanism for driving the discovery of "new" products or services from existing resources. Startup ventures can thus create robust innovations in constrained environments.

The concept of bricolage holds particular promise for social entrepreneurship. First, entrepreneurs often face severe resource constraints yet must come up with creative solutions to address social problems. Bricolage can help explain how entrepreneurs "construct something from nothing" (Baker & Nelson, 2005). Second, many social entrepreneurs approach problems that are not addressed or recognized by existing public or private institutions, and consequently operate in an institutional void. Bricolage often goes against the norm and occurs in the absence of institutional support (Baker & Nelson, 2005; Baker, Miner, & Eesley, 2003). Third, the use of advanced technology to address social problems, as in the case of technology social ventures, adds a level of complexity that requires an understanding of the role of the collective in social innovation, venture startup,

and growth. The bricolage perspective explains how robust technologies can be created by incorporating the collective feedback of a variety of stakeholders (Garud & Karnoe, 2003).

1.4 Approach and Method

My dissertation focuses on one type of social enterprise: The technology social venture (TSV). TSVs represent a unique subset of social enterprises in that they attempt to meet a social need through a technological innovation. These ventures have as their core mission the development and use of scalable technology to serve social needs. Similar to other social ventures, TSVs address the twin cornerstones of social entrepreneurship, financial return and social impact, but do so through technology. TSVs include nonprofit, for-profit, and government ventures that develop and deploy a technology to meet a social need (see Table 1 for examples). Despite the variety of organizational forms adopted in the pursuit of a social mission, each venture receives funding from direct beneficiaries or third-party sources.

In order to understand how TSVs mobilize resources and create innovative products when a social need exists but the target demographic does not have the ability to pay, I adopted a two-phase research design. During Phase 1 I conducted a three-year qualitative longitudinal study of eight ventures within a technology social venture incubator. I adopted a comparative case-based approach (Yin, 2003) to understand the processes by which technology social ventures originate, develop, and grow.

Drawing upon this exploratory study and the literature on resource-mobilization (Baker & Nelson, 2003; Penrose, 1959), I developed a model to explain how technology social ventures identify opportunities, mobilize resources, and attract and maintain users to sustain growth. The model suggests that certain financial conditions (i.e., external funding source) and institutional conditions (regulatory, technology, political stability, and human development) will predict whether a venture uses bricolage or resource-seeking to mobilize resources and develop their product. The model also suggests that the use of collective agency will moderate the relationship between resource mobilization and venture scalability into new markets.

I tested my hypotheses on a sample of 202 TSVs from 48 countries. I used a sampling frame of all ventures in a TSV dataset maintained by the Technology Museum of Innovation in San Jose, California. The dataset is a professionally evaluated resource created from a survey of TSVs engaged in technology social entrepreneurship. The TSVs in this dataset apply technology to solve social problems in the sectors of education, equality, environment, health, and economic development. These sectors are classified by the Millennium Project[1] of the United Nations as principal areas that are representative of social enterprise activity.

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[1] The Millennium Project was commissioned by the United Nations Secretary General in 2002 to reduce extreme poverty, hunger, disease, and lack of adequate shelter while promoting human rights, gender equality, education, and environmental sustainability (http://www.unmillenniumproject.org).

Table 1.1: Examples of Technology Social Ventures (TSVs)

Akshaya is a technology social venture project run by the stage government of Kerala in India. The Akshaya project was piloted with 400 computer centers connected through a wireless internet infrastructure. In the first phase of the project, nearly 600,000 people were trained in basic computer skills. Akshaya is currently being expanded to seven other districts in Kerala as part of the state wide roll out. *www.akshaya.net* *(TSV type: Government project)*
Benetech is an incubator organization in Silicon Valley that develops technology social ventures. The social venture projects attempted by the incubator are in diverse areas, for example, human rights, education, literacy, disability access, and civic participation and the environment; and as such are representative of the wide range of applications of social entrepreneurship. The organization was also the recipient of numerous social venture industry awards including the Skoll Award for Social Entrepreneurship, the Schwab Foundation Award for 2003, and the Social Capitalist award from Fast Company, Inc. *www.benetech.org* *(TSV type: Non-Profit Incubator)*
Project Impact, Inc. is a non-profit organization that focuses its efforts on avoidable disabilities relating to sight and hearing, which are often both a cause and consequence of poverty. Project Impact's core competencies are technology transfer for establishing manufacture of affordable medical products, and development of financially sustaining healthcare service delivery models. Project Impact established manufacturing; distribution sites and created an inventory for 11,000 hearing aids. The venture attempts to design and implement solutions that are sustainable based on earned income, and not dependent in future years on donations. *www.projectimpact.org* *(TSV type: Non-Profit venture)*
Voxiva is a for-profit technology social venture. By leveraging the web, phone, fax, email, and text-messaging, Voxiva deployed a technology solution to track diseases, monitor patients, manage programs, report crime, and respond to disasters in many regions of the developing world. The Voxiva solution is a real-time data collection, analysis, and alert system that combine established telecommunications networks with decision support and structured communication and information sharing systems. Voxiva's systems have been deployed by private organizations and government agencies in the U.S, India, Peru and Nigeria. *www.voxiva.net* *(TSV type: For-profit venture)*

1.5 Findings

I developed and tested a model of social venture resource-mobilization and growth in penurious environments. I empirically examined how 202 technology social ventures in 42 countries mobilized resources for venture creation. Of these, 101 ventures subsequently scaled into at least one new market.

In answer to my first research question, *how do entrepreneurs mobilize resources in resource-constrained environments,* my dissertation demonstrates that social ventures can originate, develop, and grow through two modes of resource-mobilization: bricolage and resource seeking. I empirically demonstrate that ventures often use bricolage in the absence of external financing. They also use bricolage when faced with low levels of institutional support (e.g., business regulation, technology regulation, and human development).

In answer to my second research question, *how does the form of resource mobilization affect venture scalability,* I empirically demonstrate that the presence of collective agency is particularly important to the venture scaling into new markets. I also show that bricolage without collective agency can have a direct negative effect on market scalability. However, the presence of collective agency can decrease the negative effects of bricolage on scalability.

To summarize my findings: bricolage can help a venture start up in penurious environments, but a higher collective level of bricolage is required in order for the venture to scale.

1.6 Contribution

This dissertation makes three contributions to the entrepreneurship literature. First, it shines a light on an alternative framework of resource mobilization through bricolage (Baker & Nelson, 2005; Levi-Strauss, 1966) and suggests that firms can make do with the "junk" resources at hand, yet survive and sometimes even grow. Second, this dissertation presents a framework that links two critical factors in entrepreneurship research: mobilization of resources and venture growth in penurious environments. To my knowledge, this work is the first to theorize and test such a relationship in entrepreneurship. Third, this dissertation highlights the role of collective agency in venture (and market) development. It makes an important contribution by extending the traditional person-centric entrepreneurship literature to highlight the role of resources, users, partners, and institutions in the founding and growth processes of new ventures.

My dissertation is the first large-sample empirical study on technology social ventures. It contributes to social entrepreneurship research by identifying the institutional factors which affect how social ventures mobilize resources and by empirically testing its hypotheses on a large sample that contains different organizational forms (nonprofit, for-profit) and sectors (education, health, economic development, environment, equality). By focusing exclusively on technology ventures engaged in social innovation, this dissertation contributes to an understanding of how technology may be used to address social problems in an economically sustainable manner and ultimately transform human development.

1.7 Organization of the Dissertation

This dissertation is organized into seven chapters. Chapter 2 presents the concept of bricolage as a way to conceptualize the resource-mobilization process. Bricolage is described at the venture level as "making do with the resources at hand." At the collective level, bricolage emphasizes the role of "external stakeholders and partners in the technology development process." It has the potential to explain how TSVs develop in resource-poor environments, and is an appealing concept for how technology is developed and deployed to address social problems.

In Chapter 3, I review the social entrepreneurship literature. A major stream in that literature deals with how social entrepreneurs acquire and utilize resources to serve a social mission. A second stream addressed the constraining and enabling role of institutions on social enterprise. However, neither stream is grounded in a theoretical framework that explains how technology social ventures create innovative products despite severe resource constraints.

In Chapter 4, I qualitatively compare eight technology social ventures within a single incubator in order to illustrate how TSVs mobilize-resources and innovate. In this exploratory analysis, I use bricolage as a theoretical lens to develop a framework and propositions that I test using a large sample of technology social ventures.

Chapter 5 details the large sample study and the research methods used to test my hypotheses derived from the qualitative study of Benetech. I discuss the

choice of sample, variables measures, and methods. In Chapter 6 I test my hypotheses on 202 technology social ventures and discuss the results of the analysis. I conclude with Chapter 7, where I discuss my contributions to entrepreneurship research and implications for practicing entrepreneurs.

Chapter 2: Bricolage: Resource-Mobilizing in Entrepreneurship.

2.1 Introduction

The term *bricolage* owes its academic origins to Levi-Strauss (1966), the French structural anthropologist. The word connotes resourcefulness and adaptiveness; of making do with things at hand, and thereby designates both ongoing processes and intermediary outcomes. Recently, two contrasting streams of research have applied the concept of bricolage to the study of entrepreneurship. The first stream employs bricolage to explain how ventures develop in economically-depressed environments. The second stream uses bricolage to explain the development of high-technology ventures. Since technology social ventures (TSVs) often operate in resource-constrained environments, while developing and deploying technology to meet a social need, it appears that bricolage can be very applicable to understanding TSV development. Entrepreneurs use bricolage to construct resources in penurious environments (Baker & Nelson, 2003), and with little institutional support (Chao, 1999; Lanzara, 1998; Stark, 1996). Table 2.1 summarizes the literature on bricolage.

This chapter reviews the bricolage concept as applied to entrepreneurship and is organized in four sections. The first section situates the concept of bricolage within two theories of resource-mobilization, 1) resource-dependence theory, and 2) the resource-based view. In the second section I examine bricolage as a

resource-mobilizing activity that occurs within a venture. An individual act of bricolage is defined as "making do with current resources, and creating new forms and order from tools and materials at hand" (Baker, Miner & Eesley, 2003:264; Levi-Strauss, 1966). The literature on bricolage as a resource-mobilizing activity describes how entrepreneurs thrive by constructing useful resources and extracting services out of junk materials (Baker & Nelson, 2005; Baker, Miner, & Eesley, 2003; Harper, 1987). Bricolage is a particularly useful concept to explain how firms develop in economically-depressed environments when external resources are hard to procure.

In the third section I review the use of bricolage in technology entrepreneurship. Technology ventures are viewed as a subset of ventures in which the resource set is complex. No individual can have complete knowledge of all the resource combinations available to any venture. Individual actors within the venture develop subjective plans and interpretations of a given resource set (Ciborra, 1996). Actors external to the venture (e.g., users, institutional actors, strategic partners) also develop interpretations of the same resource set. This literature stream suggests that the resultant resource-mobilizing process can only be explained at the level of the collective. This stream explicates the concept of collective agency, and in so doing develops explanations of opportunity enactment at the collective level (Garud & Karnoe, 2003).

In Section 4, I explain how the bricolage lens can be used to understand technology social ventures (TSVs). Recent comparative case studies of both failed

and successful TSVs suggest that in order to serve a social need, such ventures must be locally relevant, have a local sense of ownership, and provide local content (Braund & Schwittay, 2006; Desa & Kotha, 2006; Koch & Caradonna, 2006; Tongia & Subramanian, 2006). My review suggests that ventures develop certain characteristics as they use bricolage to mobilize resources. These characteristics can include knowledge of the resources at hand, close ties to the local community, and an ability to work around environmental constraints. I contend that the characteristics developed through bricolage are locally relevant and can be beneficial to the development of TSVs.

Table 2.1: Summary Literature on Bricolage

Paper	Baker & Nelson 2005
Research Question	How do entrepreneurs in resource-poor environments render unique services?
Unit of Analysis	small resource-constrained firms
Sample	40 small resource constrained firms in an economically depressed mining community. Four case studies of young firms in technology intensive industries
Research Design	induced theoretical model from participant-observation and interviews.
Results	An initial market is created by the entrepreneurial firm through the process of bricolage. Bricolage is defined as making do by applying combinations of the resources at hand to new problems and opportunities. Bricolage features =the collection and storage of physical inputs, origin and breadth of skills used by personnel, nonconformity to craft standards, industry practices, and legal regulations, and the nature of their social networks. Entry into broader markets requires a restriction of bricolage (a move from parallel to selective). Parallel bricolage: regularities in bricolage features that reinforce one another to embed firms in a community of practice and create an organizational identity. This often helps firms survive with a bare minimum of resources, but limits growth. Selective bricolage: use bricolage selectively along some dimensions to create something from nothing. Narrower temporary use of bricolage, limited to particular departments, functions or exploratory actions within a firm.

Table 2.1 (contd): Summary Literature on Bricolage

Paper	Baker, Miner, Eesley 2003
Research Question	What is the process by which technology entrepreneurship unfolds?
Unit of Analysis	knowledge-intensive young firms
Sample	25 consulting firms (primary sample) 21 software firms, 22 faculty start-ups (secondary sample)
Research Design	open ended, semi-structured interviews Apply improvisation lens to the qualitative data collected
Results	32% of primary sample firms used a DPE causative model, while 68% used improvisational processes For many entrepreneurs, the reality of the business emergerd from the process of playing pretend while giving accounts in search of legitimacy among resource providers while founders made use of a broad variety of means and resources at hand during and after founding, founder's comments suggested that they relied on pre-existing personal and professional networks (the means at hand) as their primary means of access to resources needed. there appears to be a trade-off between the development of improvisation and dpe competencies for the same activity Use of prior contact networks is more likely for improvisation based founding than dpe founding

Table 2.1 (contd): Summary Literature on Bricolage

Paper	Garud & Karnoe 2003
Research Question	How is it possible for one group of actors deploying modest resources to prevail over another deploying far superior resources?
Unit of Analysis	wind turbine technology development
Sample	U.S and Denmark wind turbine industry
Research Design	Matched case study following the development of a single technology
Results	Technology entrepreneurship entails not just the discovery of opportunities by alert individuals or speculation of the future, but also the creation of new opportunities by a collective. It is possible for different paths to emerge depending on specific starting positions and subsequent dynamics that unfold Distributed actors offer inputs to generate a virtuous learning cycle to forge a viable technological path With bricolage actors improvise and adapt to unfolding structures as they transform the emerging path to higher functionalities With breakthrough, technology is developed independent of owner-user and regulatory feedback. There is a lower degree of mutual co-shaping and a lower buildup of a stock of knowledge to ensure recovery in case the technical approach fails.
Paper	Ciborra 1996
Research Question	How do high-tech firms survive in an uncertain environment where recombinations occur at speed and frequency?
Unit of Analysis	Organization structure
Sample	Olivetti, a computer vendor is analyzed over a ten year period
Research Design	Case study based inductive theory development
Results	Such a perspective looks at organizations as platforms, or contexts out of which specific structures are extracted, tried out and discarded, similar to bricolage processes. The platform organization may appear confused and inefficient, but its strength lies in the readiness to sport whatever organizational form is demanded. On the surface the platform organization looks like a stable pool of "junk" resources ,"badly organized" according to efficiency criteria, but ready to be deployed when the technology or marketing strategy requires it.

Table 2.1 (contd): Summary Literature on Bricolage

Paper	Lanzara 1998
Research Question	What are some viable mechanisms to counter the self-destructive nature of institution building?
Unit of Analysis	stability of institutions
Sample	
Research Design	theoretical argument
Results	A number of factors make it difficult to replace old institutional arrangements with new ones. Uncertainty about the future, risk aversion, sunk costs, short run/long run disparities, specialized competencies and resources, distributive problems across time and space, fuzzy identities, lack of trust, often combine and interact with one another to give birth to weak and unstable outcomes. Institutional bricolage - occurs ex-post as a codification of previously unplanned change. There is a loose coupling between plans, intentions, actions and outcomes. While viewed as second-best when compared to formal law-making or constitutional engineering, institutional bricolage may produce long term, large scale consequences and structures that work under conditions of high uncertainty, risk aversity, lack of trust, political conflict, resource shortage and high-sunk costs. It is a way of coping with complexity.
Paper	Chao 1999
Research Question	Why did a ritual constructed as a bricolage of shamanic and state symbols fail?
Unit of Analysis	shamanic ritual
Sample	shaman ritual in the village of Naxi, China.
Research Design	ethnographic case study and induced explanation
Results	Social myths and fragments of myths as materials at hand for the construction of new ideologies. The contradictory symbols and elements used, led villagers to question their own political and ideological view, which was in contrast to the shaman's view, and resulted in the villagers rejecting the ritual

Table 2.1 (contd): Summary Literature on Bricolage

Paper	Stark 1996
Research Question	How do actors in the post-socialist context build organizations?
Unit of Analysis	organizational resources (property and assets)
Sample	Interviews with actors in banks, property agencies, political parties and government ministries. 6 Hungarian enterprises, ownership structure data set for Hungary's 200 largest corporations and top 25 banks.
Research Design	Field research to induce theory followed by test on a large sample data set.
Results	In a post socialist context, actors transform property through a decentralized reorganization of assets and the centralized management of liabilities. By attempting to hold resources that can be justified by more than one legitimating principle, actors blur the boundaries of private and public, the boundaries of enterprises and the boundedness of justificatory principles. Recombinant property is a form of organizational hedging, or portfolio management, in which actors respond to uncertainty in the organizational environment by diversifying their assets, redefining and recombining resources. It is an attempt to hold resources that can be justified or assessed by more than one standard of measure.
Paper	Hull 1991
Research Question	By what process did American academic jurisprudence come into being in the early twentieth century?
Unit of Analysis	networks
Sample	
Research Design	
Results	American academic jurisprudence in the early twentieth century is not the story of great individual theorists of intellectual movements or schools. It is the story of intellectual, institutional and personal networks. At key intersections of these networks were not heroes of ideas, but bricoleurs, men who put together bits and pieces of existing theories to innovate a new American approach to legal thought.

2.2 Theories of Resource Mobilization

Entrepreneurs in general are often confronted with resource constraints because of a lack of access to external sources of capital, material or expertise. While entrepreneurs often initially finance the venture out of their own savings (Aldrich 1999), most do not have the assets or income to fully exploit the entrepreneurial opportunity (Shane 2003). As the existing resource set gets depleted the entrepreneur is compelled to make do or search for new resources. This resource mobilization may happen frequently during all stages of a new venture (Bhide 1992, Baker, Miner & Eesley 2003). How then do ventures originate, develop and grow despite resource constraints? Two prominent management theories, resource-dependence theory (Pfeffer & Salancik 1978) and the resource-based theory of the firm (Penrose 1959) provide alternative explanations to the question of resource mobilization.

Resource-dependence theory (Pfeffer & Salancik 1978) states that while firms are dependent on the environment for resources, the environment is not predictable. Consequently, firms take steps to minimize their dependence on any one organization in the environment. The theory makes three principle assumptions about resource constraints. First, while resource scarcity is a common problem faced by all firms, the environment has resources to provide to the firm. A second assumption of resource-dependence theory is that the nature of resources is largely given and unproblematic. Resources remain objective and definable independent of the specific organization embedded in the resource environment. Finally, resources

are what they are, organizations either have resources or they do not. Thus, when faced with a new challenge, entrepreneurial firms can attempt two things: a) attempt resource seeking through debt, equity or grants (cf. Shane 2003: 171), or b) avoid the problem which can result in disbanding (Sutton 1987, Whetten 1987, Miner et al. 1999), downsizing (Barker & Mone 1994) or ignoring new opportunities (Lee, Lim & Tran 1999).

Firms acting as if they were not resource constrained would simply appear foolish from this perspective (Baker & Nelson 2005). More generally, the image of an all-powerful environment placing absolute resource constraints on the firm provides an inadequate theoretical basis for explaining the survival and occasional success of entrepreneurs who embrace new challenges while employing the constrained set of resources they have at hand. Yet, firms start and survive despite severe objective resource constraints (Mahoney & Michael 2005, Kodithuwakku & Rosa 2002), without any form of business plans (Sarasvathy 2001).

The resource-based theory of firms (Penrose 1959) provides an alternative explanation of firm development in resource-constrained environments. The resource-based theory states that resources are objective and can include physical resources, labor and skills (Penrose 1959, Wernerfelt 1984). However, the resource-based theory makes two important distinguishing assumptions about the relationship between a firm and the resources it requires. First, the theory suggests that what is important is not the resource in itself, but the services that firms obtain out of these objective resources. Services are contributions that resources make to

the operations of the firm. The second assumption is that no firm perceives the complete range of services available from any resource. Consequently, resource-based theory claims that each firm is unique in its idiosyncratic relation to the resource environment. Firm differences arise because different firms elicit different services from the same set of resources. More importantly, the same resource that may be worthless to one firm can be valuable to another. This suggestion is particularly important for firms that are faced with resource constraints, yet find it hard to acquire new resources from the environment.

The bricolage perspective seizes upon the idea that firms can extract different services from the same resource. In bricolage, firms intentionally make do with existing 'junk' resources (Baker & Nelson 2005). These resources at hand are often available for free or cheaply, because others judge them to be useless or substandard. Firms then use combinations of existing resources for new purposes. Knowledge of the resources at hand enables firms engaged in bricolage to find combinations of resources that allow them to embrace new problems and opportunities. The process of combining resources serves as a mechanism for driving the discovery of "new services" from existing resources. Second, firms refuse to enact limitations of commonly accepted definitions of material inputs, practices definitions and standards. Often this practice involves going against the norm, working in the absence of institutional support. Instead, firms try out solutions, observe and deal with results. Thus, bricolage involves idiosyncratic

combinations of heterogeneous resources to address new problems and opportunities (Baker & Nelson 2005: 362).

In technology ventures, bricolage is used to explain how the same resources may serve multiple purposes rather than being conceptualized as a tool for a single use. Especially, in technological environments, recombinations of existing tools can occur often and serve as the basis for value creation (Baker, Miner & Eesley 2003, Ciborra 1996). The literature also considers the role that collectives play in the development of a venture (Hull 1991, Garud & Karnoe 2003). Especially during venture growth, resource mobilization involves the efforts of a multiplicity of actors. These actors include users, partners with complementary assets and those in institutional forums. Resource mobilization is embedded in the exchanges between these actors, within emerging knowledge and social structures (Garud & Karnoe 2003, Hull 1991). While bricolage is in essence a rudimentary theory on resource mobilization, it recognizes the role played by external conditions in the development of the venture.

In the following sections, I first summarize two studies that describe bricolage as the use of resources at hand. I then expand the lens to include the effects of institutions and collectives on the process of resource mobilization. This rudimentary theory of bricolage makes predictions about the role of institutions and the role of external actors in resource-mobilization and venture development.

2.3 Bricolage: Making do with resources at hand

Bricolage is defined as "making do by applying combinations of resources at hand to new problems and opportunities" (Baker & Nelson 2005: 33). In a study of the founding processes of 25 technology consulting firms in the computer training and air pollution industries, Baker, Miner and Eesley (2003) found that 32% of firms used a formal design-precedes-execution planned, causative model, while 68% used improvisational processes of *making do* in firm creation. In many cases, founders sequentially discovered and created their venture by making do with what they had, and in the process, often imparted complexity and a unique characteristic to that venture. Often, the founding teams did not search broadly for, or plan in advance for specific resources, but rather drew on resources readily at hand. The founders engaged in bricolage with regard to customers, financing, suppliers, office space, advice and employees (Baker et al. 2003: 265). Specifically, the founder's reliance on pre-existing personal and professional networks as the *means at hand* (emphasis in original) illustrates how bricolage may be used in individual acts of firm creation.

In a follow-up study of 29 resource-constrained firms in an economically depressed community, Baker and Nelson 2005 suggested that unique services can be created by the entrepreneurial firm through the process of bricolage Here, individual acts of bricolage were widely encompassing and included "the collection and storage of physical inputs, origin and breadth of skills used by personnel, nonconformity to craft standards, industry practices, and legal regulations, and the

nature of their social networks." Entrepreneurs who used bricolage were able to provide products or services (housing, cars, billing systems, etc.) that would otherwise be have been unavailable to customers (because of poverty, thriftiness, or lack of availability). In this study, individual bricolage is the mechanism that enables the entrepreneur to enact rather than find an opportunity. Through the process of resource construction, bricolage processes enable entrepreneurs to create products and markets where none previously existed.

These two studies show that entrepreneurs attempt bricolage for different reasons. First, entrepreneurs may "make do" with the resources at hand because of a lack of access to external sources of capital, material or expertise (Baker & Nelson 2005). In this form, bricolage processes seem similar to bootstrapping (Bhide 1992). The existing resource set may get depleted and the entrepreneur is compelled to make do or search for new resources. This resource mobilization can happen frequently during all stages of a new venture (Bhide 1992, Baker, Miner & Eesley 2003). Further, resources may be sought from existing or new providers, at different stages in the entrepreneurial process. For instance, while friends and family may provide early stage funds, later stage capital may likely be sought from institutional investors (Aldrich 2001, Gartner 1985). Entrepreneurs may also make do with the resources at hand because they simply go with what they know, rather than try to search for additional resources. No attempt is made to develop or seek new theoretical structures which provide greater understanding, provide greater technical competence or encourage new approaches to problems (Hatton 1991).

Rather the response is confined within an existing set of means or techniques firmly within "a science of the concrete" (Levi-Strauss 1967). Entrepreneurs' prior knowledge corridors shape their approach to the act of entrepreneuring (Baker, Miner & Eesley 2003, Shane 2000, Venkatraman 1997, Hayek 1945).

However, the very act of creating the venture may give the entrepreneur access to new sets of resources. Baker and Nelson (2005) provide a rich illustration of this process. The founder of Grayson Hill Farms, in the process of farming above an abandoned mine, discovered methane deposits in the mine shafts which he then used to generate electricity and heat (Baker & Nelson 2005). These newly created resources were in turn used to construct a greenhouse for tomatoes, from which the nutrient rich water-runoff was deployed to start a tilapia fish-farm. The act of creating the original farm resulted in the entrepreneur putting together an unlikely collection of businesses that included electricity generation, methane sales, hydroponic farming, and fish farming. This striking example of resource-construction using bricolage illustrates how entrepreneurs can develop new ventures even in constrained environments.

As Baker (2006:7) succinctly states, "Much of what is interesting about bricolage comes from the combination–artful or clumsy–of various resources at hand… What is interesting is not the simple fact of starting with little, or the sensible response of avoiding activities that devour liquidity, but rather the active things that resource constrained entrepreneurs do in order to access, draw upon and combine other resources that are available cheaply or for the taking". I draw upon

the two studies (Baker & Nelson 2005; Baker, Miner & Eesley 2003) in this section to develop a template (Table 2.2) that distinguishes the "active things" in bricolage activity from the more traditional activities associated with resource-seeking. Activity descriptions of bricolage and resource-seeking differ along each resource dimension of material, labor and skills. A more detailed description of the template and its operationalization is provided in the methods discussion (Section 5.3) of this dissertation.

In the following section I review the effect of institutions on bricolage activity. I then look at the role of collective agency, a collaborative form of bricolage that occurs in technology entrepreneurship.

Table 2.2: Definition of Bricolage and Resource-seeking

Resource-mobilizing mode		Bricolage	Resource-seeking
Definition		Making do with current resources, and creating new products or services from tools and materials at hand." (Baker & Nelson 2003)	"Procuring standard external resources and assembling them to create a new product." Baker, Miner & Eesley (2003: 271)
Activity description for each resource type: material, labor and skills.	Material	Forgotten, discarded, worn, or presumed "single-application" materials with new use.	Buys standard components for the project. The components fit together readily.
	Labor	Involving customers, suppliers and hangers-on in providing free work on projects	Employs workers with skills suited to the project. Uses paid employees, contractors or specialists to complete parts of the project.
	Skills	Permitting and encouraging the use of self-taught skills on-the-job	Formal education and prior professional experience are employed to develop the project

2.4 The Institutional Context: Conditions that influence bricolage

During the creation of a new institution (whether a new legal form or a new market) a number of factors limit the availability of resources. These include uncertainty about the future, risk aversion, sunk costs, fuzzy identities and a lack of trust that often combine together to create or unstable outcomes (Lanzara 1998, Weick 1993). During these formative times, the bricoleur skill of using existing "junk" or fragmentary resources can prove useful. Hull (1991) cites the development of American academic jurisprudence as an example of an institution that made extensive use of bricolage during the early years. He explains how Roscoe Pound and Karl Llewellyn, two founders of American legal thought, borrowed widely from existing knowledge resources from fields as disparate as "sociology, biology, comparative law, Icelandic saga and social science" (Hull 1991: 316). Stark (1996) explains how new markets were created in post-socialist Hungary, by actors using pre-existing (and defunct) organizational resources. These actors often used recombinations of public and personal property and assets that blurred the boundaries between public and private organizational forms. The resulting capital and real estate markets were built upon a cobbled-together system in which resources often appeared under more than one holding principle.

Weak, uncertain or early-stage political, regulatory and even technological environments appear conducive to bricolage activity. Some scholars (cf. Lanzara 1998, Stark 1996) go as far as stressing that bricolage is inevitable during the

emergence of new institutional arrangements. Stark (1996:2) for instance suggests that "institution building occurs not on the ruins but with the ruins of the old regime, as available resources are redeployed to deal with emerging practical dilemmas". Ciborra (1996) suggests that high-tech firms are able to survive by creating a toolbox of technology elements that can be re-used and redeployed to meet the demands of the changing technology market.

To summarize, the literature is fairly coherent in linking bricolage activity to weak, uncertain and emergent institutional conditions. However, scholars strongly debate the effect of bricolage activity on organizational outcomes. For example, Lanzara (1998) argues that bricolage activities have a positive effect on organizational performance. Organizations that a) make use of limited resources at hand, and b) constantly add or modify these resources through recombinations and repetitive tinkering, can create large scale structures that are capable of working under these unstable conditions. In contrast, Chao (1999) cautions that bricolage activities can have a negative effect on performance. Ventures that make use of resources with contradictory or alternative meanings to the popular ideological view can be rejected by the user community. The theoretical tension that arises between the positive and negative outcomes for organizations that use bricolage in uncertain institutional conditions is an interesting area of future research.

2.5 Collective Agency and Resource Mobilization: A collaborative view of technology entrepreneurship

In the previous section I reviewed how bricolage can help explain the process by which individual entrepreneurs start new ventures in resource-constrained environments. A single entrepreneur assembled or constructed resources, making do with materials, labor and skills at hand. The resource-mobilizing process could thus explained by the activities pursued by the focal entrepreneur and the founding team. In contrast, technology entrepreneurship places a different set of demands that often add complexity to the resource-mobilizing process (Shane & Venkatraman 2003). Resource-mobilization in technology entrepreneurship often involves a multiplicity of actors both internal and external to the venture (Podolny & Stuart 1995, Rosenbloom 2000, Tripsas 2001, Teece 1987). For ventures that develop and deploy new technology it is then often insufficient to look at activities within the venture to explain venture development. Rather, resource mobilization must be explained as an organizing process at the level of the collective. Garud and Karnoe (2003) and Ciborra (1996) put forward the concept of collective agency, the participatory actions of external actors, to explain how technology artifacts get developed within a venture.

Collective agency is especially salient in technology entrepreneurship for two reasons. First, different actors have varying degrees of involvement, which can affect resource mobilizing within the venture. Second, complete knowledge of

resource combinations is not possessed by any one actor, because the resource set (the materials, labor and skills) is complex.

Ciborra (1996) suggested that in technology ventures the resource-set is complex. Complete knowledge of resource combinations is not possessed by any one actor. Consequently, individual actors develop subjective plans and interpretations of a given resource set, and the resultant organizing process can then only be explained at the level of the whole. Ciborra (1996) provides an explanation for how high-tech firms are able to survive in an uncertain environment by drawing upon a ten-year case study of the Italian computer manufacturer Olivetti. As computer manufacturers faced rapid and frequent technological changes in the 1990s, information about available technology was often not possessed by any single group within the Olivetti organization. As a result, there appeared to be a large amount of overlapping and obsolete "junk" resources within the organization. These resources were badly organized according to efficiency criteria, but proved useful as the organization attempted to bricolage. Actors within the organization were able to mobilize and reconfigure these resources to provide robust solutions whenever the technology or marketing strategy required. Ciborra (1996) suggests that the strength of the organization lay in its ability to mimic the activities of an individual bricoleur at the level of the collective. The organization thus served as a platform for collective bricolage, with specific structures being extracted, tried out and discarded. This process of collective bricolage helped the venture develop robustly despite the uncertain technological environment.

Garud and Karnoe (2003) suggest that the complexity of the resource-set implies that technology entrepreneurship is then as much about the people involved with the technologies as it is about the people who create the ventures. Every technology involves the efforts of a multiplicity of actors (Callon, 1986; Braun & McDonalds, 1982; Van de Ven & Garud, 1993; Karnøe, 1993; Latour, 1991). These actors include not just those who create and discover new ideas, but also those who develop complementary assets (Teece, 1987), those who participate in institutional forums (Garud & Rappa, 1994), and customers who offer critical inputs that shape emerging fields (Rosenberg, 1982; von Hippel, 1986; Kline & Pinch, 1996; Tripsas, 2001). All these actors become involved in different ways to shape an emerging technology.

Garud and Karnoe (2003) use the term "involved" to connote actors' active participation from their particular frame of reference. Each actors 'frame of reference' is linked to four different arenas, which are labeled as: Arena of production, arena of use, arena of regulation, and arena of evaluation. For instance, in the arena of production designers and producers (producers in the rest of the document) become involved and enact their beliefs and experiences on the design and production of technological artifacts. In the arena of use, users become involved based on the meanings that they attach to products with respect to their forms, functions, and values in use (Pinch & Bijker, 1987). Evaluators become involved based on their understanding of the tests and standards required to compare and contrast different products (Constant, 1980; Garud & Rappa, 1994).

Regulators enact laws based on their beliefs on the efficacy of specific policy instruments to shape the rate and direction of a technology's development (Baumol, 1990; Dobbin, 1994; Jørgensen & Karnøe, 1995).

The constitution of actors involved is not necessarily stable. Some actors may leave even as others become involved with a technological field, and yet some actors may develop new frames and identities as a product of their involvement (Latour, 1991). Even those involved at any point in time may have varying "levels of inclusion" with the technology on different dimensions of merit or relevance (Bijker, 1987, Garud & Karnoe 2003). Moreover, the identities and frames of the actors involved can change as they participate in an emerging technological field (March, 1994). Van de Ven and Garud (1993) document that in the emergence of cochlear implants; actors making advances in basic science were associated long before those who were involved in its commercial development and in developing a regulatory framework. In contrast, Meyer, Gaba and Colwell (2006) illustrate that in the emergence of the nanotechnology industry, venture capitalists and institutional actors became associated at a very early stage. Further, the level of participation ebbed and flowed as the technology went through various stages of development.

The presence of multiple actors with different levels of involvement implies that agency is distributed across actors (Hayek, 1945; Garud & Kotha, 1994; Tsoukas, 1996; Hutchins, 1995; Girard & Stark, 2001). Actors become involved with a technology in different ways with different identities and interpretive

frames. No amount of additional data can reduce the “interpretive asymmetry” that exists between them (Van Looy, Debackere & Bouwen, 2001; Garud & Rappa, 1994). The question then becomes, how can resource mobilization be explained in the presence of distributed actors?

Garud and Karnoe (2003) suggest that the momentum a technology generates as it accumulates inputs from actors shapes the activities of distributed actors (Hughes, 1983). These inputs are generated through the intersection of different learning and knowledge accumulation processes that are activated as actors become involved within emerging networks of practice (cf. Garud, 1997). From the supply side, producers learn by doing and by experimenting (Arrow, 1962; Layton, 1971; Dutton & Thomas 1985). From the demand side, users generate feedback when they use products and services that emerge from the technology (Rosenberg, 1982; von Hippel, 1986; Karnøe, 1993; Kline & Pinch, 1996; Tripsas, 2001). Institutional players generate other kinds of learning. For instance, those in regulatory bodies develop institutional mechanisms and policies to "steer" the technology development process (Kemp, Schot & Hoogma, 1998).

There are multiple opportunities for mutual shaping and learning from the inputs of distributed actors. Garud and Karnoe (2003) suggest that a technological field is co-created through a “collective bricolage”, the interweaving of the activities and learning processes that result in a steady accumulation of artifacts, tools, practices, rules and knowledge. Co-creation implies the contingent shaping

of one arena by activities in the other, thereby blurring the boundaries between arenas of activities such as the market, regulation, production and evaluation.

In sum, the development of a new technology is a process that progressively builds upon the inputs of the many people involved. Because knowledge of the resources at hand is often distributed among different people, the process of resource combination through which both resource environments and opportunities are enacted often involves a great deal of give and take among members of the firm, as they iteratively figure out ways to combine what is at hand. Not only do these people engage with the technology, but with one another. In the process, these actors create opportunities for learning. Eventually, the knowledge that is generated from these learning opportunities becomes embodied in the actors and embedded in emerging artifacts. This accumulated knowledge serves as a platform that enables and constrains the activities of the many involved. In other words, actors shape the development of a technology that in-turn shapes them. Resource-mobilization, besides being dependent upon the actors within the venture, is also embedded in the knowledge and social structures that link the venture to the collective.

2.6 Summary

Studies on bricolage suggest that entrepreneurs can make do with resources at hand for three reasons: to create within penurious environments, to create despite limited knowledge, or to build upon their existing acts of creation (Baker & Nelson

2005; Baker, Miner & Eesley 2003)). In each case, institutional conditions play a role in supporting bricolage activity (Stark 1996, Lanzara 1998, Hull 1991). In addition, collective agency or the participation of external actors plays an important role in the development of technology ventures (Garud & Karnoe 2003).

In the next chapter I review the literature on social entrepreneurship. This nascent field covers a wide range of non-profit and for-profit ventures that attempt to address social problems in a financially sustainable manner. However, social ventures often face severe resource constraints especially during start-up because access to philanthropic and capital markets is limited. Further, these ventures operate at the nexus of public, private and community sectors (Dees 1998). As a result, social entrepreneurs are often faced with penurious environments and limited knowledge of how to address the social problem at hand. Social entrepreneurship (and especially technology social ventures) is an exemplary context in which we can develop a theory of resource-mobilization using bricolage.

Chapter 3: Literature Review of Social Entrepreneurship

3.1 Introduction

In this chapter, I review the social entrepreneurship literature. The literature falls into four broad categories: defining social entrepreneurship, understanding how social ventures mobilize resources, examining institutional effects, and measuring the performance of social ventures. In each category I review extant literature and suggest avenues for research. The chapter concludes with a description of technology social entrepreneurship. I focus on research issues that are relevant to the broader field of technology entrepreneurship in resource-limited environments.

Social entrepreneurship is used to describe innovative approaches to solve social problems. Over the past decade, academic interest in the subject has focused on teaching in public administration and business management. Lecturers have drawn from best practice case studies, practitioner conferences, and popular press reports. Academic research interest has followed with a variety of attempts to define the field of social entrepreneurship and specify its boundaries (e.g., Austin et al., 2006; Light, 2006; Mair & Marti, 2006; Zahra et al., 2006).

There is plenty of evidence that social entrepreneurship exists, when measured by the increasing number of conferences, case studies, and funders interested in the topic. However, as a subject of research, it appears nonexistent in mainstream management literature. A search of leading management journals

revealed no articles on social entrepreneurship.[2] This raises the question: if not found in leading journals, then where? Is social entrepreneurship merely a catchphrase in the popular press, or is it a set of incommensurate approaches that share a common name?

To answer these questions I extended the literature search on social entrepreneurship to include all peer-reviewed publications from 1985-2006. I found a total of 70 peer-reviewed articles across all journals. Articles were published in ten different research domains, which may point to the cross-disciplinary nature of the subject (Table 3.1). Of the 70 articles, 32 (46%) were published in management journals, 15 (21%) in nonprofit research journals, and 11 (16%) in international studies (international development, regional studies) journals. The remaining articles (24%) were published in journals of sociology (2), accountancy (1), marketing (2), technology (3), finance (1), health, (1) and law (2). A majority of journal articles (63%) were published within the last three years (2004-2006), giving credence to the notion that social entrepreneurship is an emerging field of interest (Figure 3.1). I supplemented this literature search with five recent literature review working papers of social entrepreneurship (Light,

[2] Using the ABI-Inform database, I searched for articles that met three criteria (c.f. Busenitz et al 2003): (1) publication in one of the seven major academic journals in the field of business management: Academy of Management Journal, Academy of Management Review, Strategic Management Journal, Journal of Management (JOM), Organization Science (OS), Management Science (MS), and Administrative Science Quarterly; (2) use of one or more key words related to social entrepreneurship in the article title or abstract (i.e., social entrepreneurship, social entrepreneurial, social entrepreneur, social venture, social enterprise); and (3) publication between 1985 and 2006 inclusive. All editor notes, book reviews, review articles on the entrepreneurship domain, and replies to published articles were omitted so that the data would contain only articles and research notes that were non-invited and peer reviewed.

2006; Mair & Marti, 2006; Perrini & Vurro, 2006; Wry, 2006; Zahra et al., 2006) in an attempt to capture the current state of the field.

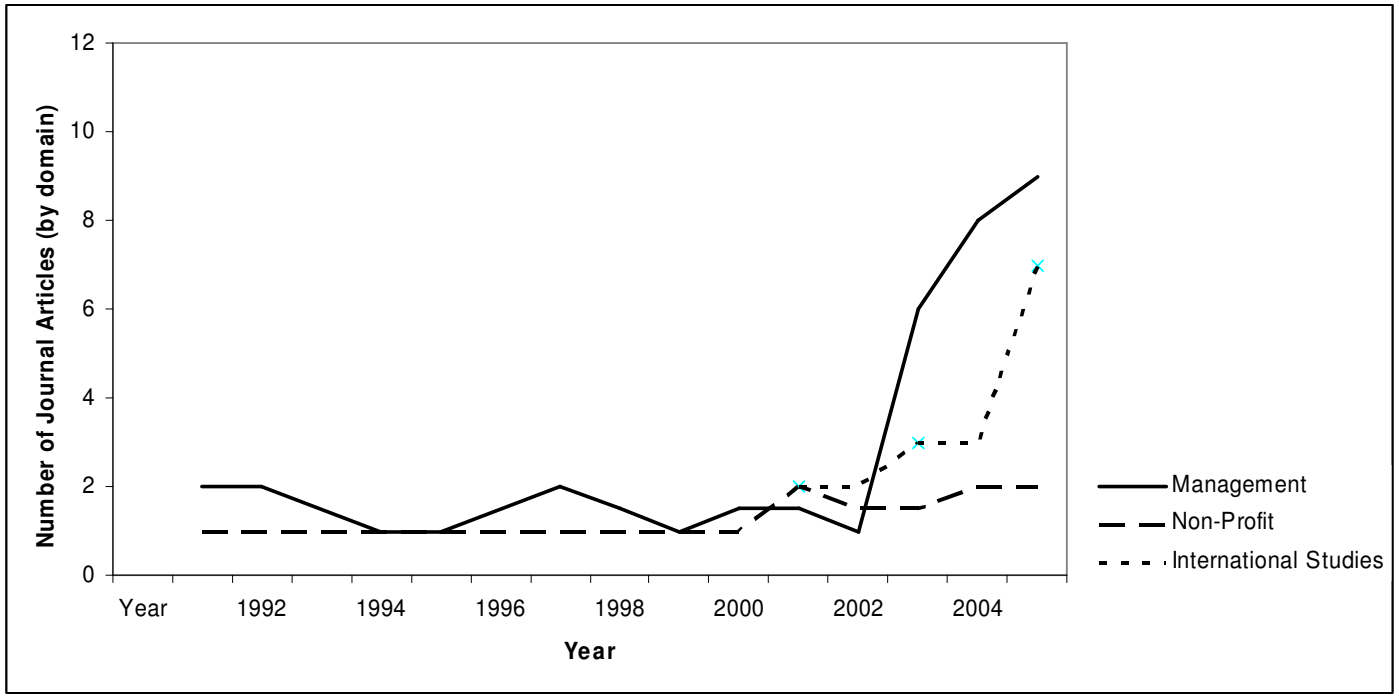
A review of the emerging literature on social entrepreneurship suggests four broad streams. First, there are studies that that attempt to define the field of social entrepreneurship and differentiate it as a unique phenomenon of study. Definitions of the field draw on arguments found in the management, entrepreneurship, and organizational theory literatures. Social entrepreneurship is described as a set of innovative approaches that are used to address social issues (Wry, 2006). Frameworks are presented to capture the different types of social ventures. The individual social entrepreneur and the nature of opportunity play prominent roles in this literature.

A second stream focuses on the resource-constrained environments within which social enterprises operate. This literature is largely descriptive, and focuses on how social enterprises acquire and utilize resources to serve their social missions. A third stream addresses the constraining and enabling role of institutions on social enterprise. Literature in this stream focuses on internal governance mechanisms and external regulatory actions that influence social entrepreneurship at the level of individuals, ventures, and communities. A recent addition to this stream focuses on how social entrepreneurship may occur despite existing institutions, thereby changing public perceptions and creating new markets in the process.

A fourth stream focuses on performance metrics for social entrepreneurship. Philanthropic and investment perspectives are used to describe venture sustainability and social performance. Such literature suggests that a measure of social return on investment is necessary for traditional financial accounting measures to accurately describe the performance of social enterprises.

Table 3.1: Social Entrepreneurship journal articles published by domain (ABI Inform search from 1985-2006)

Domain	**Total**	**%**
Management	**34**	**48**
Non-Profit	**13**	**18**
International Studies	**12**	**17**
Technology	**3**	**4**
Law	2	3
Marketing	2	3
Sociology	2	3
Accountancy	1	1
Finance	1	1
Health	1	1
Total	71	100



Two-year moving average of number of social entrepreneurship journal articles published in three domains: Management, Non-profit and International Studies[1]

Figure 3.1: Social Entrepreneurship journal articles published (by year)
(ABI- Inform search from 1985-2006

[1] Using the ABI-Inform database, we searched for articles that met three criteria (1) publication in any peer-reviewed journal (2) use of one or more key words related to social entrepreneurship in the article title or abstract, i.e., (social entrepreneurship, social entrepreneurial, social entrepreneur, social venture, social enterprise) and (3) publication between 1985 and 2006, inclusive. All editor notes, book reviews, review articles on the entrepreneurship domain, and replies to published articles were omitted so that the data would contain only articles and research notes that were non-invited and peer reviewed.

3.2 Defining Social Entrepreneurship

The term "social entrepreneurship" has two different sources of origin in the 1980s with two different meanings. Edward Skloot of the Surdna foundation used the term to highlight the possibility of income generation by a non-profit venture[3] (Light, 2005). Bill Drayton, the founder of the Ashoka organization, looked beyond the non-profit organization and described social entrepreneurship as a process that involved identifying, addressing and solving societal problems (Ashoka, 2006). Consequent definitions of social entrepreneurship have highlighted the role of the individual or the opportunity, and have ranged from the non-profit definition to the broader definition of social change (Table 3.2 lists the definitions).

In the former, social entrepreneurship typically refers to the phenomenon of applying business expertise and market based skills to the non-profit sector (Frumkin 2002; Thompson et al. 2000, Reis, 1999). As a category of non-profit research, this stream has followed the shifts in managerial competencies and market based attitudes of non-profit executives who to try to improve the operational efficiency and effectiveness of their organizations (e.g. Dart, 2004;

[3] A non-profit venture is defined as a tax-exempt organization that carries out activities described by the U.S Internal Revenue Service tax code as charitable, religious, educational, scientific, literary, testing for public safety, fostering national or international amateur sports competition, and the prevention of cruelty to children or animals. The term charitable is used in its generally accepted legal sense and includes relief of the poor, the distressed, or the underprivileged; advancement of religion; advancement of education or science; erection or maintenance of public buildings, monuments, or works; lessening the burdens of government; lessening of neighborhood tensions; elimination of prejudice and discrimination; defense of human and civil rights secured by law; and combating community deterioration and juvenile delinquency (http://www.IRS.gov/charities)

Young 1986). Social entrepreneurs are described as individuals in non-profit organizations who start social transformations by bringing about changes in the public perception of social issues (Alvord, Brown & Letts, 2004; Waddock & Post, 1991).

The latter interpretation extends the scope of social entrepreneurship to initiatives that may not fall within the non-profit sector, but yet have a prominent social mission and social purpose (Perrini & Vurro, 2006). In this interpretation, social entrepreneurship refers to an innovative activity with a social objective in either the for-profit sector, such as in social purpose commercial ventures (e.g. Dees & Anderson, 2003, Emerson & Twersky, 1996), in the non-profit sector, or as a hybrid across sectors which mix for-profit and non-profit approaches (Dees 1998; Austin 2006). In this broader interpretation social entrepreneurship may include entrepreneurship in emerging markets that serves to enhance the social, cultural or economic conditions of impoverished communities (Prahalad, 2005). Social entrepreneurship can include enterprises which have exclusively social goals and no commercial exchange (e.g. non-governmental organizations); to enterprises that feature social goals subordinate to financial goals (e.g. social cause branding undertaken by corporations) (Peredo et al., 2006). Social entrepreneurship may also include cross-sector collaborations between for-profit and non-profit ventures that address the sustainability of financial and social missions (Austin, 2000). The distinction between social and commercial entrepreneurship is not dichotomous, but rather a continuum ranging from purely

social to purely economic. Even at the extremes, there are still elements of both. That is, charitable activity must still reflect economic realities, while economic activity must still generate social value. In its broadest sense, social entrepreneurship is defined as the innovative use of resources to explore and exploit opportunities that meet a *social* need in a *sustainable* manner (Mair & Marti, 2004). I adopt this definition in my study of TSVs, since the primary emphasis is on meeting a "social need" that market forces have failed to address or ignored. This definition also recognizes that social entrepreneurship is exercised when some person or persons (1) aim either exclusively or in some prominent way to create social value of some kind, and pursue that goal through some combination of (2) recognizing and exploiting opportunities to create this value, (3) employing innovation, (4) tolerating risk, and (5) declining to accept limitations in available resources (Peredo et al., 2006).

In the following sections I highlight three research streams that much of social entrepreneurship literature seeks to address: the acquisition and utilization of resources, institutional effects on social entrepreneurship, and performance evaluation. Table 3.3 provides a summary view of the literature and the main research areas.

Table 3.2: Definitions of Social Entrepreneurship, the unit of analysis and the research focus.

Author(s)	Definition	Unit of analysis	Research Focus
Young (1986)	Non-profit entrepreneurs are the innovators who found new organizations, develop and implement new programs and methods, organize and expand new services, and redirect the activities of faltering organizations (p.162)	non-profit entrepreneur	Individual
Waddock & Post (1991)	Private sector leaders who play critical roles in bringing about 'catalytic changes' in the public sector agenda and the perception of certain social issues (p.393)	private sector	Individual
Thompson, Alvy & Lees (2001)	People who realize where there is an opportunity to satisfy some unmet need that the state welfare will not or cannot meet, and who gather together the necessary resources (generally people, often volunteers, money and premises) and use these to 'make a difference'(p. 328).	subset of business entrepreneurship	Opportunity
Thompson (2002)	People with the qualities and behaviors we associate with the business entrepreneur but who operate in the community and are more concerned with caring and helping than 'making money' (p. 413)	social entrepreneur	Individual
Frumkin (2002)	Social entrepreneurs have a combination of the supply-side orientation and the instrumental rational, providing a vehicle for entrepreneurship that creates enterprises that combine commercial and charitable goals" (p. 130).	social entrepreneurship	Opportunity
Alvord, Brown & Letts (2004)	Social entrepreneurs are individuals who are catalysts for social transformation. They are leaders who need two types of skills: 1) the capacity to bridge diverse stakeholder communities, and 2) long term adaptive skills and response to changing circumstances.	social entrepreneur	Individual

Table 3.2 (contd): Definitions of Social Entrepreneurship, the unit of analysis and the research focus.

Author(s)	Definition	Unit of analysis	Research Focus
Barendsen & Gardner (2004)	Social entrepreneurs are unusual "in terms of their compelling personal histories, their distinctive profile of beliefs and their impressive accomplishments in the face of odds" (p. 50). The social entrepreneur is a new version of the long existing term "changemaker".	social entrepreneur	Individual
Light (2006)	A social entrepreneur is an individual, group, network, organization, or alliance of organizations that seeks sustainable, large-scale change through pattern-breaking ideas in what and/or how governments, nonprofits, and businesses do to address significant social problems.	social entrepreneur	Opportunity
Dart (2004)	Social entrepreneurship is an encompassing set of strategic responses to many of the varieties of environmental turbulence and situational challenges that nonprofit organizations face today (p.13)	non-profit innovation	Opportunity
Perrini & Vurro (2006)	Only those innovators who are able to actively contribute to social change with creativity and innovation, typical of the classical entrepreneurial process, can be called social entrepreneurs, regardless of their specific organizational form (for-profit or nonprofit).	social entrepreneur	Individual
Mair & Marti (2004)	Social entrepreneurship is defined as the innovative use of resources to explore and exploit opportunities that meet a social need in a sustainable manner	social entrepreneurship	Opportunity
Dees (1998)	Social entrepreneurs possess five criteria: 1)adopting a mission to create and sustain social value; 2) recognizing and relentlessly pursuing new opportunities to serve that mission; 3) engaging in a process of continuous innovation, adaptation and learning; 4) acting boldly without being limited by resources currently in hand; and 5) exhibiting a heightened sense of accountability to the constituencies served and to the outcomes created (p.4)	social entrepreneur	Individual

Table 3.3: Social Entrepreneurship Literature Review.

Literature Category	Sub-category	Antecedent literature	Representative articles	Theoretical Lenses
Definition (What is Social Entrepreneurship ?)	Innovative approaches to solve social problems.	Entrepreneurship	Drayton (2002), Peredo et. al (2006), Mair & Marti (2006)	
	Earned income activity of non-profits	Non-profit	Thompson, Alvy & Lees (2000), Reis (1999), Frumkin (2002)	
	Initiatives with a prominent social mission and supporting financial mission	Emerging markets (management)	Perrini & Vurro (2006), Prahalad (2005)	
		CSR, Ethics	Hemingway (2005), Harding (2005)	
Performance and Metrics (How can the performance of social ventures be measured?)	Venture Philanthropy	Best practice benchmarking	Darby & Jenkins (2003), Pepin (2005)	
	Socially responsible investing	Balanced score-card	Paton (2005), Harrington (2003)	
	Social Return on Investment		Gair (2003)	

Table 3.3 (contd): Social Entrepreneurship Literature Review.

Literature Category	Sub-category	Antecedent literature	Representative articles	Theoretical Lenses
Resource Mobilization (How do social ventures acquire and mobilize resources?)	Case-based descriptions of SE process	Exploratory (no antecedent)	Sharir & Lerner (2006), Thompson (2002), Astad (1998), Barendsen & Gardner (2004), Prahalad (2005)	Resource Based View, Resource Dependence, Social Movements
Institutional Effects (What role does internal and external governance mechanisms play in enabling or constraining social ventures?)	SE through existing institutions (governance, regulation)		Wallace (1999), Bayliss (2004), Korosec & Berman (2004)	IO Economics, Social Capital, Embeddedness
(How does social entrepreneurship occur in the absence of supporting institutional structures?)	SE against existing institutions (market failures, non-market failures, market creation)		Dean & McMullen (2005), Berthoin (2006), Sarasvathy (2006)	Institutional Entrepreneurship, Effectuation

3.3 Resource-mobilizing actions that sustain or grow a social venture.

The second stream of social entrepreneurship research focuses on the resource-constrained environments within which social enterprises operate. The literature is largely case-based and focuses on the processes by which individuals and social ventures acquire and utilize resources to serve their social mission. At the individual level, the literature focuses on highlighting the characteristics and actions of enterprising individuals at the core of a social venture. Scholars have explored how past experiences (Barendsen & Gardner, 2004), social identity (Simms & Robinson, 2005), and current environments (Thompson 2002, Astad 1998) can determine the choice of venture, and the resource-seeking actions pursued. At the venture level, scholars have looked at how venture orientation (for-profit or non-profit) affects the resource-seeking behaviors and the consequent sustainability of the venture (Lasprogata & Cotten 2003, Shaw 2004).

Past experiences: Specific experiences, many of them early in life, may help explain social venture formation. Barendsen and Gardner (2004) conducted a qualitative study based on small matched-samples and in-depth interviews, which suggested that social entrepreneurs have a much higher incidence of childhood trauma and parents with high levels of social and/or political engagement. They point out that "priorities suddenly become clear when life seems short or when one faces a stark choice. Under such circumstances, a calling may be discovered" (Barendsen & Gardner 2004: 44). Social entrepreneurs also have past experience working with social issues. Social entrepreneurs are "energetic, persistent, and

unusually confident, with an ability to inspire others to join them in their work" (Barendsen & Gardner: 45). They are also deeply committed to their cause, very independent, and able to explain the link between their specific goals and a broader picture of an alternative world. Almost all are also spiritual or religious, and "believe in human potential, or the possibility of change" (p. 47).

Social Identity: Social identity may predict the type of social venture and the consequent resource seeking actions (Simms & Robinson, 2005). Social entrepreneurs often have two identities: the entrepreneur and the activist. Although the two identities can and do co-exist (see for example, Barendsen & Gardner 2004), social entrepreneurs must decide which comes first. Simms and Robinson hypothesize that founders with a primary activist identity will be more likely to create nonprofit organizations, while those with a primary entrepreneurial activity are more likely to create for-profit entities. However, the perceptions of benefits and risk are driven by very different goals; income and financial independence or social impact and recognition. Social entrepreneurs who view themselves as activists first may miss important opportunities for change. They may ignore resource-seeking actions that involve financial gains and market tools that they deem as secondary or unimportant. In contrast, social entrepreneurs who pursue the entrepreneurial identity may risk losing the legitmacy of the social cause (Dart, 2004).

In addition, social entrepreneurs often take specific actions to gain access to resources for their social ventures. In doing so, they draw on personal credibility, framing and reputation effects.

Personal Credibility: Social entrepreneurs may have significant personal credibility (past records of success) which they use to tap into critical resources and build the necessary network of participating organizations (Sharir & Lerner 2006, Thompson 2002, Waddock & Post 1991).

Framing and Reputation Effects: Social entrepreneurs take different legitimating actions to gain access to resources (Waddock & Post 1991, Astad 1998). First, they frame the project in terms of important social values, rather than in purely economic terms. This results in a sense of collective purpose among the social entrepreneur and those who join the effort. Second, social entrepreneurs focus on reputation effects by leveraging media coverage rather than through direct action.

Social Network: In an exploratory qualitative study of 33 Israeli social ventures, Sharir and Lerner (2006) concluded that the ability of a social venture to acquire the resources necessary to maintain program service and continuity depended upon the entrepreneur's social network, the ties established with other voluntary and public-sector organizations. The entrepreneur either depended upon the resources of the network to which he belonged or the entrepreneur proactively created the network and invested time and effort in constructing it. In either case, venture performance depended upon mobilizing others to allocate capital, labor and effort to a venture that had an uncertain future. The measure of performance was the

quantity of resources available for the venture's growth and development, and whether the venture met its initial goals. Other variables that affected the performance of social ventures included founder commitment, the initial capital base, venture legitimacy in the public discourse, team composition, private and public sector alliances, market tests, and previous managerial experience.

Notably, the literature on resource mobilization has focused on the role of the individual entrepreneur and has left out the role of the collective. The founding social entrepreneur seeks resources based upon personal credibility, past experiences, and social ties. The roles played by the stakeholder communities of investors, volunteers, and partners is largely absent in explaining how social ventures acquire resources, serve customers, and grow. For example, the economics of a social entrepreneurial venture often make it difficult to compensate staff as competitively as in commercial markets. In fact, many employees in social entrepreneurial organizations place considerable value on nonpecuniary compensation from their work (Austin et al. 2006). Yet these stakeholder communities are vital to nascent ventures in resource-constrained environments. There remains much interesting research to be done on the role played by the collective, investors, volunteers, and other stakeholders in acquiring and utilizing resources.

3.4 Institutional effects on social enterprise

A third stream of research focuses on the effect of institutions on social enterprise. Institutions are defined here as the humanly derived constraints that structure human interaction. They are made up of formal constraints (i.e. rules, laws, constitutions), informal constraints (i.e. norms of behavior, conventions, and self-imposed codes of conduct), and their enforcement characteristics (North 1997). This stream looks at whether social entrepreneurship happens through or against existing institutions (Antal 2006). When social entrepreneurship happens *through* existing institutions, scholars look at how institutions facilitate and create boundaries of practice for social ventures (e.g. Lasprogata & Cotton 2003). Social entrepreneurship often takes place at the intersection of multiple institutions and may be influenced concurrently by the government, the market, and the community (Shaw & Carter 2004). The predominant research focus has been on policy, governance, and regulatory effects that enable or constrain the community development efforts of social entrepreneurs (Wallace 1999, Bayliss 2004, Korosec & Berman 2004).

When social entrepreneurship happens *against* existing institutional arrangements, the creation of a venture may in itself cause a change in that existing institutional arrangement (Mair & Marti 2006). For example, environmental degradation may be seen as the result of a market failure caused by existing institutional arrangements. Dean and McMullen (2005) provide an example of how entrepreneurs resolve environmentally relevant market failures by seizing upon

potentially profitable opportunities. As these entrepreneurs succeed in creating sustainable businesses, public perception is changed, and institutions are reconfigured to accommodate the new market.

SE Through Existing Institutions: Community development and Social Enterprise

This section looks at how social enterprises may help institutions meet the needs of communities, and vice versa. Social enterprises may serve as the bridge between disadvantaged communities and existing institutions (Wallace 1999, Bayliss 2004). As a complement, existing regulatory institutions may serve as an important resource to social entrepreneurs dedicated to helping the community (Korosec & Berman 2006).

Porter (1995) made the case for inner-city development through existing free-market institutions. His model for rejuvenating the inner city argued for the operation of profitable businesses with an export orientation within a regional economy, built upon the talents of local entrepreneurs and mainstream private organizations to confront issues of poverty and unemployment. However, inner city markets pose a challenge for business managers and entrepreneurs because many do not understand how to address the significant social and institutional factors that restrict market entry (Robinson 2006). Porter's model was also criticized by Emerson and Tversky (1996) as being unrealistic for the inner city community. For example, getting a job was often not as significant a milestone as keeping it. Many

residents lacked the basic skills regarding how to act and/or contribute to a work setting.

In such cases, social enterprises may help lower entry barriers to business by forming a link between the social issues relevant to the local context and the economic benefits of the market. Wallace (1999) examined the role of social enterprises in facilitating inner-city community development in the United States. She suggested that in contrast to traditional businesses and volunteer agencies, social enterprises formed an effective social, political, and economic link between the government and free market enterprise. Social enterprises such as affirmative businesses and direct-service agencies played a large part in revitalizing the local community by providing self-help, development of local jobs, businesses, and human resources by and for communities. These enterprises provided viable alternatives for transitional employment into the mainstream business community.

Korosec and Berman (2006) examined how existing institutions helped social entrepreneurship, here defined as the activity of private individuals and organizations taking initiatives to address social challenges in their communities. Based on a national survey and in-depth interviews among jurisdictions with populations over 50,000, the authors found that municipal governments helped social entrepreneurs by 1) increasing awareness of social problems, 2) helping them to acquire resources, 3) coordinating with other organizations, and 4) implementing programs. Nearly three-quarters of cities provided active or moderate support, which was positively associated with the perceived effectiveness of nonprofit

organizations in their communities. Specific efforts included the development of new programs and services that brought counseling, awareness and support for teenage truancy, substance abuse, public health, environmental protection, and public safety. The authors concluded that municipal government support for social entrepreneurship is an important approach for strengthening communities.

SE Against Existing Institutions: Market Failures and Institutional Entrepreneurship

When social entrepreneurship happens *against* existing institutional arrangements, the creation of a venture may in itself cause a change in the existing institutional arrangement (Mair & Marti 2006, Sarasvathy 2006). There is a limited emerging literature that looks at social entrepreneurship from the perspective of institutions (Mair & Marti 2006, Antal 2006). In this literature, the realization of new ideas requires combining the energies and resources from different institutions and often involves pushing conventions aside or creating new space between existing institutions. This literature follows from work in institutional entrepreneurship that attempts to explain how institutions arise or change (DiMaggio 1988, Fligstein 1997). The literature also draws upon theories new institutional economics (North 1997) and critiques of the same (Olson 1996, Simon 1991).

An example of social entrepreneurship against existing institutions is put forward by Sarasvathy (2006) who argues that in contrast to current separations

(for-profit vs. non-profit) in business and society, equity markets should be opened up to all social ventures that invest in human potential, whether they be for-profit or non-profit. Existing institutional arrangements are often designed to achieve a variety of organizational goals through collective action. For-profit organizations for example, achieve goals through the specific institutional arrangement we call the "market". Non-profit organizations achieve goals through non-market mechanisms that include charity and philanthropy. Sarasvathy (2006) points out that there are problems with market and non-market mechanisms. Social enterprises that are able to survive under these conditions are forced to go against existing institutions, and come up with creative mechanisms that incorporate the best of both market and non-market solutions. For example, Dean and McMullen (2005) describe how entrepreneurs resolve environmentally relevant market failures by seizing upon potentially profitable opportunities. As these entrepreneurs succeed in creating sustainable businesses, public perception is changed, and institutions are reconfigured to accommodate the new market.

Mair and Marti (2006) argue that the institutional entrepreneurship perspective is a promising way to understand the role of social entrepreneurship in changing or giving birth to norms, institutions and structure. It may be an interesting lens through which to study the emergence of social entrepreneurship; for example, by examining the conflict between the values of social entrepreneurs and their perceptions of reality or, in institutional entrepreneurship terminology, between social entrepreneurs' beliefs and their shared norms (i.e., institutions).

Mair and Marti (2006) propose that social entrepreneurship can also inform theory on institutional entrepreneurship. Neither DiMaggio's (1988) nor Fligstein's (1997) theory of institutional entrepreneurship are explicit about the paradox of embedded agency. Highly embedded actors may be conditioned by the very institution and therefore not consider changing existing rules. Embeddedness might reflect both an enabling and a constraining condition at the same time. Although it is easier for highly embedded social entrepreneurs to ensure access to resources and win legitimacy, less embedded actors are more likely to engage in social ventures that challenge rules and norms, as they are not ''locked'' into the existing structure.

3.5 Performance & metrics of social ventures (funding, philanthropy, measures)

The fourth stream of literature addresses funding sources, performance, and performance metrics of social ventures. The non-distributive restriction on surpluses generated by nonprofit organizations and the embedded social purpose of for-profit or hybrid forms of social enterprise limits social entrepreneurs from tapping into the same capital markets as commercial entrepreneurs. Funding sources typically fall into two categories – philanthropy, and investment. Ventures that fall toward the non-profit, non-governmental end of the social enterprise spectrum typical receive funding from philanthropic sources (Austin et. al 2006, Pepin 2005). Ventures that have earned income strategies that fall towards the for-

profit end of the spectrum, receive funding from socially responsible investors, or social venture funds (Harrington 2003, Pepin 2005). Such commercial ventures often seek financial return on investment by creating an earned income enterprise operated by charities and their trading/holding companies alone or in partnership with the corporate sector (Ott 2001, Austin 2003, Lasprogata & Cotten 2003).

Social Venture Investing: Socially conscious investors make decisions by screening for positive and negative issues, shareholder advocacy, community investing, and providing social venture capital (Harrington 2003, Orlitzky, Schmidt & Rynes 2003, Hillman & Keim 2001). Screening is usually the first step to make sure companies do not produce objectionable products or engage in practices such as discrimination or environmental pollution. Harrington (2003) suggested that investors with more customized social screens bought individual stocks, as opposed to mutual funds. Investors with a social focus also found opportunities to buy into new or growing companies before they sold shares to the public. Socially responsible venture funds often provided lists of companies that produced socially responsible products, who sought investment capital. Social venture capital is also used to fund commercial ventures but rather than seeking a complete return on investment; the investor may off set some or all of the investment against social outcomes (Pepin 2005).

Venture philanthropy: Within the context of venture philanthropy, charities, venture capitalists and entrepreneurs often work together in strategic alliances (Pepin 2005, Austin 2003). Human resources and funding are invested as donation

in the charity by entrepreneurs, venture capitalists, trusts and corporations in search of a social return on their investment. Venture philanthropy involves high engagement over many years with fixed milestones and tangible returns and exit achieved by developing alternative, sustainable income (Brainerd 1999). Venture philanthropists may also invest without establishing an equity position in the commercial enterprise. Any profits are re-directed to mission-related activity, although the business activity may or may not be mission related (Pepin 2005).

Funding and performance metrics are closely related. Scholars have called for the inclusion of social return performance metrics in addition to financial performance metrics (Walsh & Margolis 2003, Paton 2003). Performance metrics used by practicing social ventures include social return on investment (SROI) developed by the Robert's Enterprise Development Fund in the U.S (Gair 2003), best-practice benchmarking (Darby & Jenkins 2006), and adaptations of the Kaplan and Norton's Balanced Score Card (Paton, 2003). However, there are few journal articles on social entrepreneurship that have included any measure of performance (Light 2005). The field has tended toward case-based research, with small in-depth descriptive studies that are biased towards successful social ventures. The literature search detected 24 case-study based articles (number of cases in each sample varied from 1 to 33), and only one large sample study (n=70, Sharir & Lerner 2006).

One particularly in-depth study provided a comparative analysis of 7 cases of social entrepreneurship from Asia, Latin America, North America and Africa

(Alvord, Brown & Letts 2004). The authors detected certain patterns associated with successful social entrepreneurship that lead to significant changes in the social, political, and economic contexts for poor and marginalized groups. These patterns included similarities in the core innovation, the leadership and organization and in scaling up that produced societal transformation. First, the innovation characteristic common across social ventures was an ability to mobilize the existing assets of marginalized groups. Second, successful social entrepreneurship initiatives were often founded by leaders with the capacity to work with and build bridges among very diverse stakeholders. Leaders also emphasized systematic learning within the organization. Third, scaling the social enterprise occurred in three ways. Social entrepreneurship initiatives built local capacities to solve problems. Capacity building strengthened local capacities for self-help and then scaled up to a wider range of clients. Social ventures also provided product "packages" to solve problems. These initiatives scaled up coverage with services that could be delivered by low skill staff to individuals or small groups. Finally, ventures often built social movements to deal with other powerful actors. Social movement building expanded influence by alliances and campaigns to shape the activities of decision makers. The above characteristics of social entrepreneurship are especially embodied in technology social ventures.

3.6 Research Gaps

Social entrepreneurship as an emerging field has plenty of challenges and opportunities for research. The challenge for researchers is how to judiciously apply theories from other domains to answer questions relevant to the situations in which social entrepreneurs may find themselves (Mair, Hockerts & Robinson 2006). The opportunities lie in being able to test and refine management theories in a unique domain. In this section I highlight some research gaps and suggest possible extensions to nascent research on social ventures. Table 3.4 provides a summary of research questions that complement the current state of social entrepreneurship research.

The founding of social ventures: Scholars have found that personality characteristics, childhood experiences, family background and professional experiences play a role in who becomes a social entrepreneur (Barendsen & Gardner 2004, Sharir & Lerner 2006). An interesting extension to this research would describe the antecedents to social venture formation. From where do ideas for social enterprises arise? There also remains much work to be done to understand how social venture opportunities are identified and evaluated. The role of community in resource-mobilization is surprisingly understudied. Scholars have shown that ties to partner organizations are important (Austin 2003, Sagawa & Segal 1999). However, the emphasis remains on the focal social entrepreneur, and downplays the contributing actions, the collective agency of the community. Emerging entrepreneurship research shows that ventures are founded as a result of

the actions of many (cf. Garud & Karnoe 2003), yet this aspect remains unexplored.

Mobilization of resources: Researchers have documented how social entrepreneurs seek resources to sustain or grow a venture. Specifically, social entrepreneurs rely upon personal credibility, framing effects, media leverage and ties to other organizations. Surprisingly, there is no mention of how these social entrepreneurs mobilize resources to start the venture in the first place. Some anecdotal evidence we have available suggests that social entrepreneurs make do with what they have (Bornstein 2003), or proactively create their network (Sharir & Lerner 2006), with no mention of how new social ventures emerge. From the case-studies and articles, social entrepreneurship often occurs in environments with a scarcity of resources. From inner-city neighborhoods in the United States (Porter 1995) to small villages in Brazil and India (Bornstein 2003) social entrepreneurship flourishes in resource-constrained environments. An environment is resource constrained if it provides new challenges, whether opportunities or problems without providing new resources (Baker & Nelson 2005). However, while implicitly acknowledging these resource constraints in case studies, few authors have explicitly looked at whether entrepreneurship in such environments of extreme scarcity is different from conventional business entrepreneurship. Social entrepreneurship is an ideal test-bed to study entrepreneurship with resource-constraints.

Institutional effects: Researchers have shown that institutions can support social ventures, and preclude others. Some ventures are supported by formal institutions (Korosec & Berman 2004), while other ventures emerge despite a lack of institutional support (Sarasvathy 2006). An interesting development of this work would describe how institutional conditions play a role in the emergence of social ventures, and how social ventures might respond to institutional actions. Indeed, social entrepreneurship is a promising phenomenon in which to study institutional entrepreneurship. Institutional entrepreneurs are actors who have an interest in modifying institutional structures or in creating new ones. in changing or giving birth to norms, institutions and structure (DiMaggio 1988, Fligstein 1997). While researchers have alluded to the fact that social entrepreneurs leverage resources to create new institutions or transform existing ones (Mair & Marti 2006), there remains much work to explain the processes by which this transformation may occur.

In summary, social entrepreneurship research is in a very early stage, yet draws from distinguished antecedent literatures. The definitions of social entrepreneurship may be traced back to writings on non-profit organizations (Hansmann 1980, Young 1982), corporate social responsibility (Kanter 1999, Wartick & Cochran 1985) and entrepreneurship (Gartner 1985, Shane & Venkatraman 2000). Research on the acquisition and utilization of resources by social entrepreneurs has largely been case-based but is starting to draw upon theories of resource-dependence (Pfeffer & Salancik 1978), the resource-based

view (Barney 1991, Peteraf 1993) and social capital (Burt 1997, Putnam 2000). Theories of competitive advantage (Porter 1995) and institutional entrepreneurship (DiMaggio 1988) are drawn upon to understand how social entrepreneurs may navigate social and institutional barriers (Robinson 2006, Wallace 1999).

Table 3.4: Research questions for social entrepreneurship[1]

The founding of social ventures
Where do ideas for social enterprises come from?
How are opportunities for social entrepreneurship identified and evaluated?
How does the community play a role in the founding of the venture?
What affects the extent and form of competition and collaboration among social enterprises?
Acquisition and utilization of resources
How does for-profit / non-profit orientation affect resource mobilization in a social venture?
To what extent is social entrepreneurship a collective effort? What role does the community play in the acquisition and utilization of resources?
What are the most effective ways for a social entrepreneur to mobilize and manage stakeholders?
How does innovation (technological, service or organizational) occur within a social enterprise?
How does a social entrepreneur determine the optimum mix of financing sources for the social enterprise? To what extent do these activities create tension with mission or organizational values?
What role do incentives play in the mobilization of stakeholders in social enterprises?

[1] From the literature review and Austen et al 2006, Mair et al 2006, Desa & Kotha 2005

Table 3.4 (continued): Research questions for social entrepreneurship[1]

Institutional Effects (through and against institutions)
How do contextual forces shape opportunity creation for social entrepreneurship?
How do country or community contextual differences change these forces?
What are the effects of market forces on the formation and behavior of social enterprises?
To what extent do social enterprises correct market failure?
Do social enterprises perform the function of early-stage risk assumption and market development
What new financial instruments may be designed to overcome some of the current deficiencies in the philanthropic capital markets?
Funding and Performance effects
What are the key drivers of the philanthropic capital markets?
How can one measure social-value creation?
How can entrepreneurs best communicate the social value proposition to different stakeholders?
To what extent are earned-income strategies successful?
To what extent can pecuniary incentive systems of businesses be effectively utilized in social enterprises and, vice versa, to what extent can nonpecuniary incentive systems in social enterprises be deployed in businesses?

[1] From the literature review and Austen et al 2006, Mair et al 2006, Desa & Kotha 2005

3.7 A bricolage framework for social entrepreneurship

The review of social entrepreneurship research suggests that resource-mobilization is a particularly challenging activity for social entrepreneurs. There is plenty of social need (problems and opportunities), but few resources to address the need. The literature review also suggests that institutional support is an important factor that enables or constrains the development of social enterprise. Finally, incorporating diverse stakeholders into the social venture is a recurrent theme in the literature on social enterprise capacity-building and scalability. The challenge for researchers in an early-stage field such as social entrepreneurship is how to judiciously apply theories from other domains to answer questions relevant to the situations in which social entrepreneurs may find themselves (Mair, Hockerts & Robinson 2006).

This section explains why bricolage is a compelling lens to apply to the study of resource-mobilization in technology social ventures. Studies on bricolage suggest that entrepreneurs can make do with resources at hand for three reasons: to create within penurious environments, to create despite limited knowledge, or to build upon their existing acts of creation (Baker & Nelson 2005; Baker, Miner & Eesley 2003).

Social entrepreneurs are often faced with penurious environments and limited knowledge of how to address the social problem at hand. Bricolage explains how entrepreneurs can create ventures despite an inability to attract funding or standard resources to the venture. First, ventures can combine existing, freely available, cheap,

or junk material to create a product that meets a social need. Second, ventures can make use of pre-existing contact networks to draw upon friends, volunteers and other interested parties as a source of labor and support. Third, the bricolage perspective suggests that ventures can learn as they go, on the job rather than hire professionally trained engineers and developers.

Social entrepreneurs are also often credited with coming up with innovative solutions to social problems (Bornstein 2003). The challenge lies in mobilizing resources to maintain that initial act of creation. In the absence of a ready-made market that buys the venture's products and services, venture sustainability is more dependent on addressing a socially relevant problem. Market construction takes time and local commitment. Braund and Schwittay (2006) provide illustrative cases of information-technology based social ventures in Costa Rica that failed to survive despite a lot of initial community interest, government and corporate support. In each case, the social venture failed on each of three dimensions: it was not locally relevant as it did not meet a pre-existing need, it did not have a local sense of ownership, and it was not customized for local content.

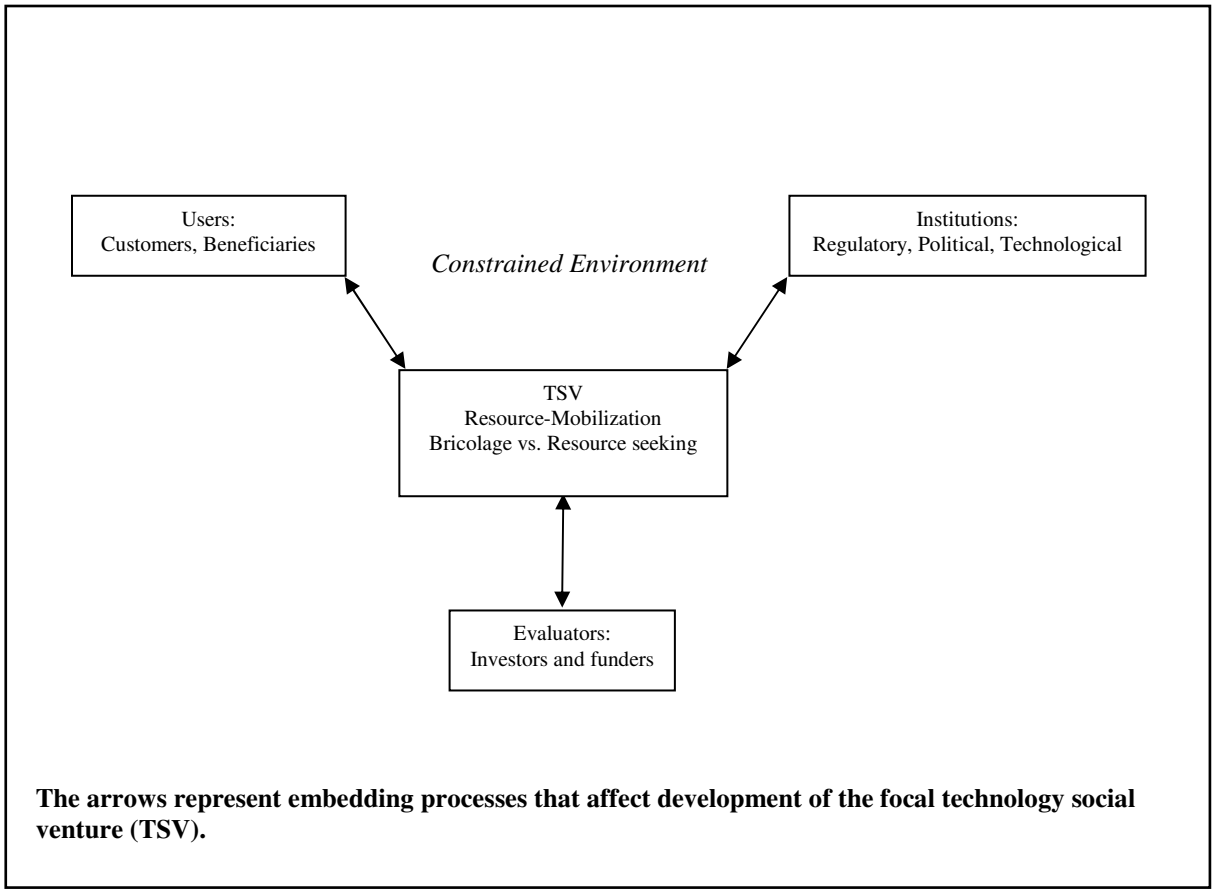
Tongia and Subramanian (2006) suggest that especially in the developing world where infrastructure and efficient capital market mechanisms have yet to be developed, technology social ventures require an in-depth understanding of the community ecosystem in which they are deployed. Drawing upon cases of technology social ventures that address education, governance and telecommunication in India, the authors suggest that ventures must scale in order to

be sustainable, yet scalability is often elusive. Even in growth, there must be an incorporation of stakeholders, local incentive structures and design participation by the local community. The incorporation of community discourse into the design process is important for technology social ventures that target new market creation or human development (Tongia & Subramanian 2006, Koch & Caradonna 2006, Braund & Schwittay 2006).

The bricolage lens appears to be uniquely suited to addressing technology social venture development. First, by working with local resources at hand, social ventures incorporate the pre-existing knowledge of the local environment into the venture. The venture is forced to be locally relevant. Second, by using informal sources of labor like friends and volunteers, bricoleurs often build ties to the local community. The social venture becomes a focal point for local interaction and creates a strong sense of community. In turn this can increase the local sense of ownership in the venture as the community sees the venture as one of their own. The use of bricolage can lead to an incorporation of local stakeholders and encourage design participation by the local community.

Technology social ventures are also faced with institutional constraints as they attempt to address social problems without supporting regulatory, technology or political structures. The collective agency perspective on bricolage may help develop an understanding of the problem as it explains how technological artifacts can gain widespread adoption in the absence of existing institutional channels. Technological artifacts depend upon multiple actors for their survival and adoption

in new markets. As illustrated in Figure 3.2, the collaborative interaction between different actors: the technology social venture, the evaluators, the regulators, and the users, explains how a technological field is co-created through the interweaving of the activities and learning processes that result in a steady accumulation of artifacts, tools, practices, rules, and knowledge.



The arrows represent embedding processes that affect development of the focal technology social venture (TSV).

Figure 3.2: Conditions that affect the resource-mobilizing process within technology social ventures

In the next chapter, I conduct an exploratory study of 8 technology social venture projects within a social entrepreneurial incubator. I draw upon the social entrepreneurship literature and the bricolage lens to illustrate the embedding processes that affect resource-mobilization in a technology social venture. I introduce propositions that relate resource mobilization to three arenas of influence: the source of funding, the institutional actors, and the participative actions of the local community.

Chapter 4: An Exploratory Study of Technology Social Ventures

4.1 Introduction

In this chapter I describe an exploratory study of technology social ventures (TSVs) that develop and deploy technology to meet a social need. I adopt a comparative case study of eight ventures within a single incubator (Benetech), to understand the process by which technology social ventures mobilize resources in order to originate, develop, and grow. The Benetech incubator provides natural controls for the initial endowments.

Despite similar initial endowments, the eight ventures developed differently. Some grew, others stagnated, and still others were disbanded. I characterize the resource-mobilization process within the ventures as either bricolage or resource-seeking. Bricolage processes make do with combining preexisting resources to carry out the task at hand, while resource-seeking involves obtaining standard resources designed specifically for the task. The conceptual distinction between bricolage and resource-seeking helps to illustrate the creative use of scarce resources and the conditions that influenced the venture development processes for these eight ventures.

Drawing upon the bricolage literature and the comparative case study, I develop propositions to explain how social ventures mobilize resources to originate, develop, and grow. I also describe how collective agency can influence the growth of the venture. Collective agency is defined as the participatory actions

of external actors in venture development. TSVs attracted different constituencies of external actors, including funders, technology partners, and users. The collective agency of these external actors influenced the resource-mobilization process. Ventures that grew were able to patch together different constituencies of users. In the process of mobilizing collective agency, a market was created for the technology products and services.

In the sections that follow, I introduce the Benetech incubator and discuss the research methods adopted. I develop a Resource Mobilization model and a Market Scalability model. The Resource Mobilization model examines how technology social ventures mobilize resources to develop a product. This model also considers the effect of institutional support on the resource-mobilization process. The Market Scalability model looks at the moderating effects of collective agency on developing a venture and a large user-base.

4.2 A qualitative study of Benetech: A technology social venture incubator.

Introduction to the Benetech incubator

Jim Fruchterman, a Silicon Valley entrepreneur founded Benetech in 2000 with the express goal of developing and distributing technologies whose humanitarian promise dwarfed their profit potential. The Benetech incubator has played a pioneering role in combining technological solutions with a social entrepreneurship business model to help disadvantaged communities. The social venture projects attempted by the incubator were in diverse areas including human

rights, education, literacy, disability access, and civic participation. These areas are representative of the domains in which social ventures operate. For example, 85% of the 1600 global social entrepreneurs recognized by the Ashoka foundation carry out activities in these domains.

The Benetech incubator was also the recipient of numerous social venture industry awards including the Skoll Award for Social Entrepreneurship, the Schwab Foundation Award for 2003, and the Social Capitalist award from Fast Company, Inc. In addition Bookshare.org and Martus, two individual ventures within Benetech, have received recognition at the Tech Awards for technology social ventures benefiting humanity. For these reasons, I considered the organization to be an exemplar revelatory case to explicate development processes within a technology social venture. Table 4.1 displays a summary view of the different projects within Benetech ca. 2004.

The start-up capital for Benetech came from the sale of an organization called Arkenstone. In 1989 Jim Fruchterman had started Arkenstone, a not-for-profit supplier of reading machines for the visually impaired. Arkenstone generated 99% of its own operating revenues through sales, and in June 2000, was bought by a for-profit company, for approximately $5 million. This infusion of cash paved the way for the founding of Benetech in late 2000. By mid-2004, the incubator had grown to include multiple projects that addressed different areas of social need. Jim and the management team solicited project ideas and feedback through discussion lists and numerous meetings with technologists in Silicon Valley. The ideas for two

of the eight projects within the incubator came from Jim. Two other social-venture projects drew upon ideas from within the organization. Ideas for the remaining four projects came from sources external to the organization.

Table 4.1: Technology Social Venture projects within the Benetech incubator

Venture Name	Description	Sector	Start Date	Funding Source
Bookshare.org	An Internet library where members of the blind, visually impaired and reading disabled community can legally store and share scanned publications.	Disability Access	1999	Benetech + External Grant
Martus	Provides for the creation, encryption and secure storage of reports of human rights abuses. The system improves the accessibility of human rights information to help assure that violations will be recorded and those responsible held accountable.	Human Rights	1999	Benetech + External Grant
Human Rights Data Analysis Group	Applies information technology solutions and statistical techniques to help human rights advocates build evidence-based arguments.	Human Rights	2004	External Grant
All-Link	Internet service providing best-practice reading and writing instruction to students with significant disabilities.	Literacy	2002	External Grant

Table 4.1 (contd): Technology Social Venture projects within the Benetech incubator

Venture Name	Description	Sector	Start Date	Funding Source
Bookaccess	An initiative delivering digital books to improve access to information for poor and illiterate populations in the developing world.	Literacy	2003	External Grant
Landmine Detector Project	Adapts cutting-edge technologies to the needs of humanitarian landmine removal.	Human Rights	2002	External Grant
Libre	Seeks to bring truly affordable and usable open source software to users in the developing world and schools, nonprofits and government agencies in the industrialized world.	Civic Participation	2002	Benetech
ReadingCam	Developing a prototype device for people with visual disabilities that can locate, recognize, and speak text found in the general environment.	Disability Access	2003	Benetech

The incubator structure provides a natural control for the effect of management team and organizational structure. Jim explained the 'investment-driven dynamic' adopted by the incubator as analogous to the numerous venture capital investments made in technology ventures in Silicon Valley:

> Benetech, in many ways acts as a venture-capital partner, making investment decisions on behalf of society and our limited partners who have donated the seed capital. Additionally, it provides a corporate home, and often the management for a nonprofit technology venture, since there is no economic motive for independent ownership of the venture. Moreover, the process to set up a nonprofit is much more involved than for a high technology for-profit company (Fruchterman, 2004b).

The management team used a standardized template (Figure 4.1) to document venture development from inception through seed funding, business plan development, financing, and operations. Jim and his associates used this process to develop and manage the social ventures. The process described in Figure 4.1 took place in the context of specific investment objectives, which specified areas of nonprofit activity and investments, established by the Benetech board to guide the venture processes within the incubator.

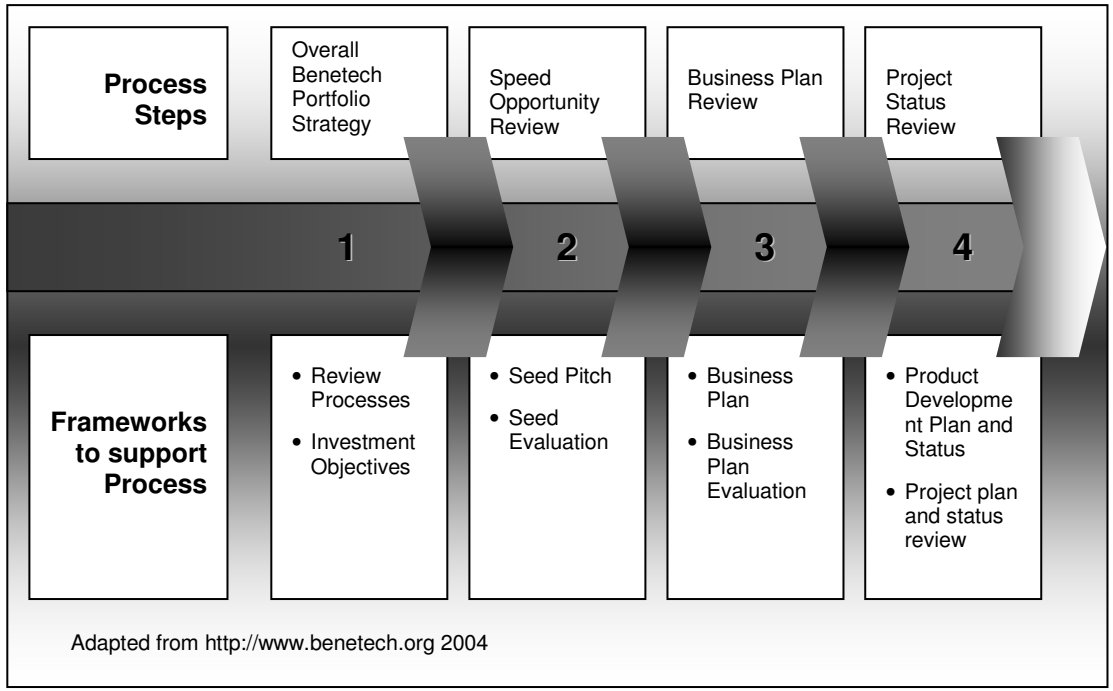


Figure 4.1. Project development process at Benetech

Approach and Methods

The research question I adopted for the field study was *how do technology social ventures mobilize resources to originate, develop, and grow?* I employ a two stage approach to explore this question. This chapter documents the first stage, an exploratory comparative study of eight ventures within Benetech, from which I develop hypotheses. In the following chapter, I describe the second-stage in which I test the hypotheses on a large sample of technology social ventures.

The richness, holism and sustained period observations offered by comparative case studies are appropriate for the exploratory stage (Lee 1998, Whetten 1989; Pettigrew, 1990). Further, since processes that underlie the evolution of new ventures can be unique and difficult to identify or measure with great precision, there is a notable lack of process-based comparative research that describes resource-seeking actions in new business ventures (Van de Ven & Engleman 2004, Venkatraman 2003). This is especially true for the nascent phenomenological context of social entrepreneurship (cf. Mair, Hockerts & Robinson 2006). However, when process research is conducted in an environment with natural controls, many processes underlying the phenomenon tend to be generalizable (Kotha, 1995; Tsoukas, 1989).

In the case of Benetech, I identified three stages in the evolution of the TSVs: the idea stage, the prototype stage and the growth stage (Figure 4.1). By June 2005, two ventures were experiencing rapid growth (Bookshare and Martus), two ventures had been terminated (Reading Cam and Bookaccess) and three

ventures were in early stages of development (Libre, Landmine and All-Link). In subsequent analyses I added an additional venture HRDAG that was informally managed by Benetech, but formally brought into the incubator in 2005. I captured development processes for each of the eight projects. As I documented patterns in the data and constructed tentative theoretical explanations (Strauss & Corbin 1998), I continued to use the data to challenge and extend the framework for resource mobilization in social entrepreneurship. I describe the sources of data and observation period in more detail in the section that follows.

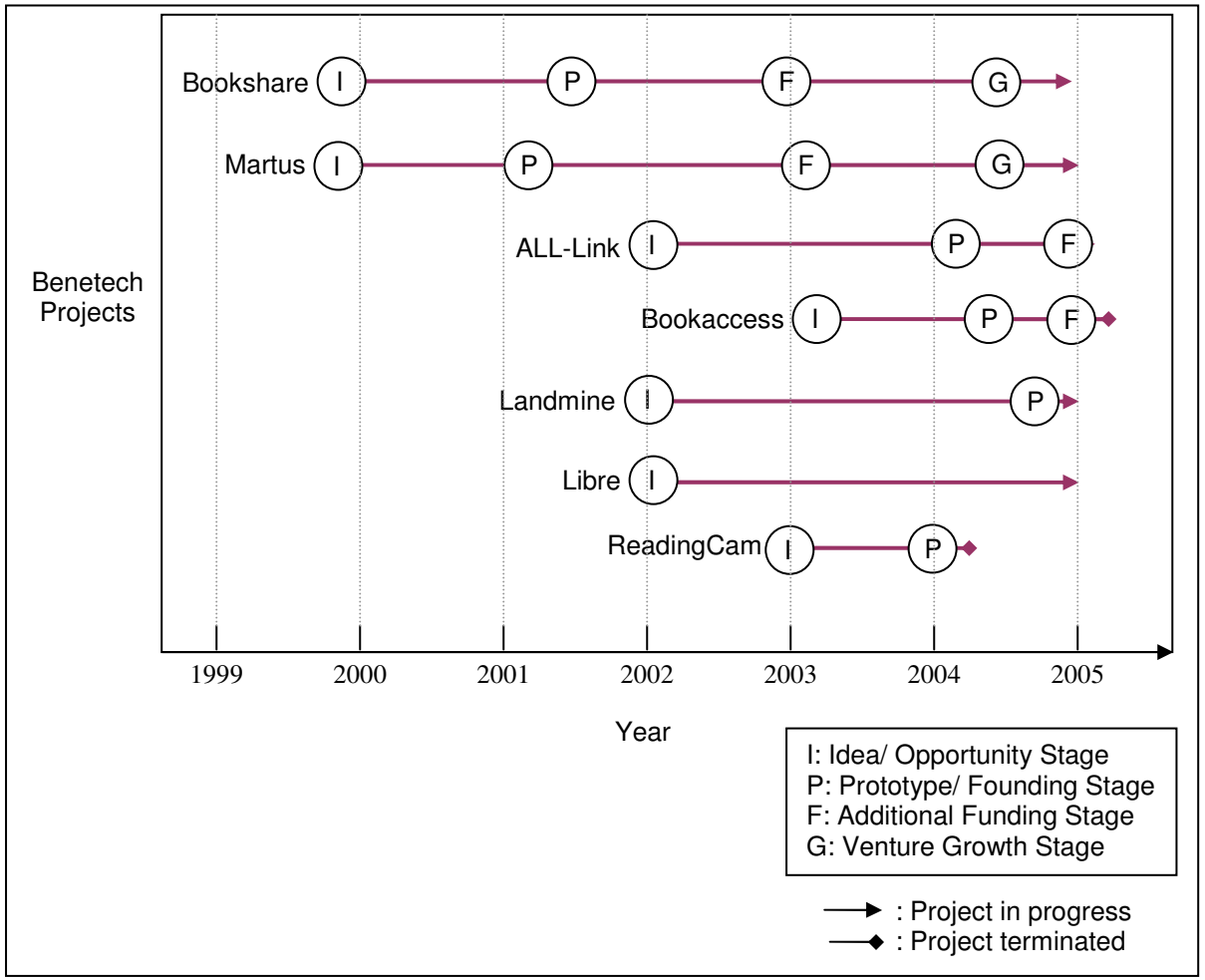


Figure 4.2: Timeline for each Benetech project

Research Design

My research design followed the multiple case method suggested by Yin (1994). I followed a control and replication logic, by selecting eight cases within a single incubator. Replication logic involves exploring a phenomenon within a single case setting, and then testing the boundaries of that phenomenon by adding cases to the initial test case. Multiple cases strengthen the results by replicating the pattern-matching, thus increasing confidence in the robustness of the theory (Yin 1994). The incubator setting provided natural controls for environmental conditions, access to resources, and available opportunities. In a similar study, Shane (2000) used the comparative case method to explain how entrepreneurial background predicted opportunity discovery. Drawing upon Yin (1994) and Shane (2000) studies as precedent, I describe the approach followed to ensure construct validity, internal validity, external validity, and reliability.

Construct Validity: Construct validity refers to establishing correct operational measures for the concepts being studied. For case-study research this is especially problematic. However, Yin (2003) suggested three tactics to increase construct validity when doing case studies 1) Use multiple sources of evidence; 2) Establish a chain of evidence; and 3) Have the draft case-study report reviewed by key informants. The use of multiple sources of evidence serves as a method of data triangulation that helps to establish a convergent line of enquiry.

I used archival information and interviews about the different social venture projects being undertaken at Benetech. The archival data utilized (from Benetech's

inception in year 2000 to 2005) may be summarized as external and internal. External archival data included news articles about the different projects, an independent non-profit study about the organization and archived public speeches and presentations. Internal archival data included project summaries, project business plans (when available), press releases, quarterly project status updates from the president, and blog summaries of external meetings (written by the president or independent participants). Quarterly update reports by the CEO, and weekly blog updates for each project helped to capture non-retrospective perspectives on the state of the company, an important part of the longitudinal case study (Pettigrew 1990).

I supplemented archival data with interviews with the various project leaders of Benetech, including the company CEO. I interviewed the CEO every six months from March 2003 to September 2005, to capture the founder perspective on the organization. I also interviewed the project managers for each project to get 'lived meanings' (Miles & Huberman, 1994) and supplement the archival data collected. The interviews were recorded and transcribed. The cumulative page content of data was over 800 pages. Then, following Eisenhardt (1989), I prepared case summaries for each project, utilizing multiple converging sources of data. Each case study was documented with citations to the source database to establish a chain of evidence. The draft study was reviewed by key informants within the organization and an independent investigator.

Internal validity: Internal validity refers to establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships (Venkatraman & Grant 1984, Yin 1994). While this study is an exploratory analysis of the evolution and growth of a technology social venture, certain considerations helped to increase internal validity. During the course of the investigation, two projects within the organization were terminated, four developed slowly, while two others grew rapidly. The variation in growth and survivability across projects helped make the descriptions of the technology social venture start-up process more robust to sampling considerations.

External validity: External validity refers to establishing the domain to which the case study can be generalized. Yin (2003) suggests using existing theory in single case studies, and a replication logic in multiple case studies. I drew from existing social entrepreneurship theory when choosing this incubator organization. The social-venture projects attempted by the incubator were in diverse areas including human rights, education, literacy, disability access, and civic participation. These domains are representative of the wide range in which social entrepreneurship research is conducted. I also selected this organization for its pioneering role as a technology social venture incubator. The organization was a recipient of numerous social venture industry awards including the Skoll Award for Social Entrepreneurship, the Schwab Foundation Award for 2003, and the Social

Capitalist award from Fast Company, Inc. For these reasons, the organization may be considered an exemplar revelatory case on technology social entrepreneurship.

Reliability: Case-study reliability requires demonstrating that the operations of a study (such as data collection procedures) can be repeated with the same results. To address data reliability, I prepared an electronic database that centralized the documentation of source data. I also developed a standardized stage-based protocol (Figure 4.2) to analyze the development of each project within the organization. During the repeated process of interrogating the data, revising the theory, and returning to the data, the themes I report in this dissertation eventually emerged. Appendix B shows an example summary table of the constructs captured in the development of the Benetech social ventures. In my presentation of results I use a combination of illustrative examples and tables describing the data from which I drew my inferences (Miles & Huberman 1994).

As I iterated from the field and archival data, to my field notes, to the literature, my conceptualization of resource mobilization in a technology social venture began to emerge. As each venture moved from the initial product idea toward the creation of a prototype and product deployment, the funding sources generally changed depending upon the stakeholders who participated in or supported the venture. Funding sources affected how resources (materials, labor and skills) were mobilized within each venture. Changes in stakeholder participation also affected the project scope, its strategic mission, as well the markets served by the venture. Such changes in turn enabled the venture to draw

upon or seek new sources of funding, as well as technology contributions, from individual or private donors interested in supporting the evolving venture. I wrote a working paper and co-authored two book chapters (Desa & Kotha 2006a, Desa & Kotha 2006b) that attempted to identify and explain regularities in our data. I presented these studies to colleagues at conferences, during which I received several rounds of critical feedback.

The next sections lead toward propositions, each dealing with a section of the broad research question: *How do technology social ventures mobilize resources to originate, develop and grow?*

Resource Mobilization Model: Question 1:*How do entrepreneurs mobilize resources in resource constrained environments?* This question addresses the resource mobilizing activities I observed in the development of the Benetech social ventures. Question 2: *What effect do institutions have on the resource mobilization process?* This question addresses how institutional support is related to resource mobilization in social ventures.

Market Scalability Model: H*ow does the form of resource mobilization affect venture scalability?* This question illustrates how resource mobilization and venture development can be shaped by the network of stakeholders.

4.3 The Resource Mobilization Model

How do entrepreneurs mobilize resources in resource constrained environments?

4.3.1 The Role of Seed Financing

Resources play a large part in the development of a new venture (Pfeffer & Salancik 2003, Penrose 1959). The acquisition and recombination of these resources into a product or service is a prerequisite of venture development (Wernerfelt 1984, Shane 2003). For a new venture these resources include materials (e.g. technology, machinery, hardware and software), labor (e.g. employees, contractors, volunteers, friends and family), and skills (e.g. knowledge of efficient processes or new technologies). Firms attempting to mobilize resources often write a funding request (business plan or grant proposal) and seek external funding to reduce the constraints they face (Shane 2003). Receipt of external financing often prompts the acquisition of standard resources (standard materials, hired employees and professional skills) that may be used by the venture to create innovative products and services.

Social ventures however, can have trouble getting financing. Investors have limited understanding and support for ventures with a double bottom line (social and financial) that conflicts with the expectations of the traditional philanthropic and capital investment community (Gair 2005, Lasprograta & Cotton 2003). The idea of social ventures earning income can be difficult for investors (e.g. foundations, banks, and venture capitalists) to sanction. For example, a major roadblock in achieving financing lies in the fact that social ventures incorporated as non-profit organizations are legally ineligible for Small Business Administration (SBA) assistance, a

traditional source of financing for traditional small business entrepreneurs (cf. Community Wealth Ventures 2003). Further, unlike traditional for-profit ventures that have the single, ultimate goal of financial return, social ventures often have dual goals of providing mission-related social outcomes as well as financial outcomes. From a capitalization standpoint, these often-competing goals have two results. First, a focus on social return may attract socially-minded investors, specifically foundations and grant makers that would not be interested in capitalizing a traditional for-profit business. Second, and perhaps more importantly, the pursuit of a social return may limit the magnitude of financial return, making the investment less attractive to many traditional for-profit business investors. Since the pursuit of both social return and financial return can create conflicting goals, both traditional for-profit investors and traditional charitable grant makers are often confused. Social ventures are left in a "no man's land" for financing and are often faced with penurious resource environments. When external funding is difficult to secure, social ventures require an alternative way of mobilizing resources. While founder-financing is an option many people lack the income to fully finance the social venture opportunity. Bricolage provides an alternative by allowing social ventures to construct resources using pre-existing materials at hand, thereby mitigating the constraints on the environment.

The Benetech case study provides an illustrative example of how social ventures mobilize resources in constrained environments. The social ventures received seed funding from a variety of sources internal and external to the incubator.

Of the eight Benetech ventures, four ventures obtained seed financing from external donors and grants (Landmine Detector, HRDAG, All-Link & Bookaccess), two made do without external funding (Libre and Reading Cam) and two ventures (Bookshare.org and Martus) obtained funding from both external and internal sources

As I catalogued activities that the Benetech ventures used to mobilize resources, I observed both resource-seeking and bricolage processes. In the resource-seeking process, the proper tools were determined for a task and then ordered. Components were designed specifically for the project and fit together readily. Paid employees, contractors or specialists were hired to complete parts of the project (c.f. Baker & Nelson 2005, Baker Miner & Eesley 2003). In contrast, bricolage activities often made use of forgotten, discarded, worn, or presumed "single-application" materials at hand that were then adapted to fit the task. Informal labor was used and customers, suppliers, hangers-on or volunteers provide work on the projects. The use of self-taught skills for a large number of diverse tasks was permitted and often encouraged. (Levi-Straus 1966, Baker, Miner & Eesley 2003). Table 4.2 provides examples of bricolage and resource-seeking for each venture. (Note: Definitions for bricolage and resource-seeking activity are provided in Chapter 2, Figure 2.1).

Table 4.2: Resource Mobilization in Benetech ventures using Bricolage or Resource seeking.

Venture	Material Inputs	Labor Inputs	Skills
HRDAG	**Resource-seeking** - External resources were purchased at project founding: The Science and Human Rights Program obtained hardware and software to study the link between environmental protection and human rights.	**Resource-seeking:** Rafe Kaplan (software engineer) and Miguel Cruz (systems and networking expert) to AAAS; statistician Jana Asher were employed to develop the statistical data analysis software.	**Bricolage -** Patrick Ball used self taught skills and field experience on human rights program requirements. **Resource-seeking** - Two software engineers were professionally trained in the area.
All-Link	**Resource-seeking:** The Route-66 project uses technology and research designed specifically for developmentally disabled children.	**Resource-seeking:** A computer science class at UNC devoted labor specifically to developing the project. Benetech also conducted staffing especially for the Route 66/ALL-Link project.	**Resource-seeking:** Karen Erickson of UNC has professional training and experience on the subject of the learning impaired tools. **Bricolage:** The Benetech team uses their prior Bookshare experience to create the ALL-Link online prototype.

Table 4.2 (contd) : Resource Mobilization in Benetech ventures using Bricolage or Resource seeking.

Venture	Material Inputs	Labor Inputs	Skills
Bookaccess	**Bricolage**: Pre-existing Bookshare software is used for the Bookaccess project. **Resource-seeking:** Benetech partners with USAID. Books, scanners, choppers and computer servers are purchased and shipped to Iraq.	**Resource-seeking:** Benetech dedicates employee time and skill to the Bookaccess project, by getting funding from the USAID project. Shipping and customs agents were hired to provide expertise on shipping the book container to Iraq.	**Bricolage:** The Bookshare team uses self-taught skills to try and extend Bookaccess into Iraq. **Resource-seeking:** Self-taught skills are insufficient, and external expertise is contracted to fulfill shipping and customs regulations.
Landmine Detector Project	**Resource-seeking:** Uses hardware and software resources external to Benetech and adapts the latest military mine detecting technology into a humanitarian de-mining tool.	**Resource-seeking:** Parag Mody and Ted Driscoll are hired as Benetech Fellows to develop a solution for landmine detection.	**Resource-seeking:** Ted Driscoll has past professional experience in the area of sensor development, Parag Mody a former senior Sun engineer is helping to cost reduce the project.

Table 4.2 (contd) : Resource Mobilization in Benetech ventures using Bricolage or Resource seeking.

Venture	Material Inputs	Labor Inputs	Skills
Libre	**Bricolage:** Existing Benetech resources are used to run the discussion group and create product specifications.	**Bricolage:** Discussion list provides interested bystanders an opportunity to provide feedback on the open-source project.	**Bricolage:** Discussants use self-taught skills about open source projects to suggest design for Libre.
ReadingCam	**Bricolage:** Customizes an existing Ipaq handheld to demonstrate prototype of a talking device to aid blind people. Obtains software resources from partner SRI for the speech engine.	**Bricolage:** Benetech engineers and partners from SRI volunteer time to the idea. Developed through a brainstorming session at Benetech of interested parties.	**Resource-seeking:** SRI has professional programming experience for handheld readers. Benetech engineers have professional backgrounds in programming.

Table 4.2 (contd) : Resource Mobilization in Benetech ventures using Bricolage or Resource seeking.

Venture	Material Inputs	Labor Inputs	Skills
Bookshare.org	**Bricolage:** Existing Arkenstone computer hardware and pattern recognition software is used for the Bookshare project.	**Resource-seeking:** Employs the Arkenstone engineering team and new hires to fulfill specific roles in development, content accumulation and distribution. **Bricolage:** secured the volunteer services of technologists and business leaders to advise and support projects.	**Resource-seeking:** Bookshare.org employed Jane Simchuck, Alison Lingane, Janice Carter with prior related professional experience.
Martus	**Bricolage:** Existing hardware from the Bookshare project was used to design the Martus prototype. Software was written by Patrick Ball, drawn from past AAAS programming experience.	**Resource-seeking:** Patrick Ball (technical advisor) and Marc Levine are employed to complete the prototype design.	**Bricolage:** Patrick Ball and Marc Levine use self-taught skills and lessons from the field to complete the Martus prototype.

Table 4.3 illustrates resource mobilization and financing for each Benetech venture. I evaluated whether the venture engaged in bricolage or resource-seeking activities along each resource dimension: material, labor and skills. Ventures that were externally funded (HRDAG, All-Link, Bookaccess and Landmine) resorted to higher levels of cumulative resource-seeking activity on all three resource dimensions. Ventures that did not obtain external funding (Libre and ReadingCam) resorted to higher levels of cumulative bricolage activity, especially along the materials and labor dimensions. I suggest that:

H1a: The lack of external financing is positively related to resource construction using bricolage.

H1b: The use of external financing is positively related to acquiring standard resources.

Two ventures (Martus and Bookshare) used both external and internal funding. These ventures engaged in both bricolage and resource-seeking. I draw upon my case-study of the Bookshare.org venture to illustrate the effect of external financing on resource mobilization.

Table 4.3: Financing source and Bricolage or Resource seeking in Benetech ventures

	Financing source		Bricolage (**B**) or Resource Seeking (**R**)				
Venture	Internal to Benetech	External Grant/ Investment	Materials	Labor	Skills	**R** score	**B** score
HRDAG	N	Y	R	R	RB	3	1
All-Link	N	Y	R	R	RB	3	1
Bookaccess	N	Y	RB	R	RB	3	2
Landmine Detector Project	N	Y	R	R	R	3	0
Libre	Y	N	B	B	B	0	3
ReadingCam	Y	N	B	B	R	1	2
Bookshare.org	Y	Y	B	RB	R	2	2
Martus	Y	Y	B	R	B	1	2

Resource mobilizing in Bookshare.org: Prior to obtaining external funding, the Bookshare team used pre-existing materials from the Arkenstone project to develop a prototype. Scanners, screen-readers and character-recognition software that were part of prior projects were assembled together to create the Bookshare online library. The venture also secured volunteer services of technologists and business leaders to advise and support the project. As Bookshare.org obtained external funding, the venture hired professional developers in addition to the existing engineering team to fulfill specific roles on the project. An executive with professional experience in traditional and online media syndication was hired to help develop the Bookshare library content and increase the distribution channels (Desa & Kotha 2006).

We see that Bookshare.org used a combination of bricolage activities (e.g. re-using materials from the Arkenstone project and making use of volunteers) and formal resource-seeking activity (hiring professional developers) in venture development. As the venture obtained external financing, the emphasis shifted away from using resources at hand, and more toward acquiring standard resources and hiring professional, experienced staff. I propose that:

Proposition: The availability of external financing will shift a venture away from bricolage and toward acquiring standard resources.

4.3.2 The institutional context

Social ventures operate at the nexus of public, economic and community sectors (Dees 1998, Mair & Marti 2006). Institutions in each of these sectors play a role in resource mobilization, and social entrepreneurship scholars have considered institutions to be especially important in the development of social ventures (Mair & Marti 2006, Antal 2004). Institutions can be broadly defined as the humanly derived constraints that structure human interaction. They are made up of formal constraints (i.e. rules, laws, constitutions), informal constraints (i.e. norms of behavior, conventions, and self-imposed codes of conduct), and their enforcement characteristics (North 1997). I consider three types of institutional environments that are applicable to social ventures: regulatory climate, political climate, and the level of human social development. Since I look at technology social ventures in particular, I also consider the level of technological development. These four institutions can facilitate and create boundaries of practice for social ventures.

Institutions can play an enabling role in helping social enterprises mobilize resources (Wallace 1999, Korosec & Berman 2006). When the goals of social ventures are aligned with those of institutions, their activities are viewed as legitimate and beneficial to the existing institutional structure. Institutional legitimation of the new venture can be in the form of accreditation, endorsements, guarantees, bonds, licenses or certification (Aldrich 1999, Scott and Meyer 1983) that result in positive signals to the resource environment. Resources acquired can include seed-money, the support of skilled grant-writing officers and business

development managers, and standard resources including office space, materials and labor (c.f. Korosec & Berman 2004). Social enterprises that have the support of institutions are more likely to gain access to resources.

While the relationship between institutional support and access to resources has been well noted in the entrepreneurship and social entrepreneurship literature, recent scholarly interest has centered on social ventures that mobilize resources in the absence of supporting institutions. A lack of institutional support implies that funding agencies are less likely to recognize the potential market or social need identified by the social entrepreneur. In such conditions, the social venture might have trouble mobilizing resources. Yet, numerous studies exist of social entrepreneurs who create social ventures despite the lack of institutional support (Sarasvathy 2006, Bornstein 2003, Desa & Kotha 2006). The realization of social venture opportunities in such cases involves combining the energies and resources from different institutions, or involves pushing conventions aside to create new social ventures and even institutional arrangements. Social entrepreneurs acting in the absence of institutional support appear to mobilize resources in a similar way to bricoleurs.

Indeed, the literature on bricolage offers numerous instances of entrepreneurs who offer innovative products and services despite the opposition of existing institutional arrangements, regulations, standards and norms (Harper 1987, Stark 1996, Dana 2005). Baker and Nelson (2005) provide an example of a car mechanic who fitted a length of pipe for a fouled catalytic converter, blatantly

disregarding government emissions standards because “no one really checked”. The car mechanic built a business on satisfying customer needs by intentionally disregarding institutional constraints. Dana (2005) relates how retired white-collar professionals in Moldova, started growing their own food and bartering with neighbors when government controlled price-inflation made most goods unaffordable. In each case the entrepreneurs used limited resources and engaged in bricolage by making do with existing junk, cheap or freely-available material, labor and skills. First, they were aware of what they could get away with, given the constraints. Second, they used creativity and knowledge of alternative resources to work around institutional constraints. These characteristics of creating “something from nothing” are also evident in social ventures.

The Benetech case study provides a good context to understand how social ventures mobilized resources in the context of different types of institutional support. Four Benetech ventures (HRDAG, ALL-Link, ReadingCam, and Landmine Detector Project) conformed closely to prevailing institutional standards. The other four Benetech ventures (Bookshare.org, Bookaccess, Martus, and Libre) provided technology products for a social need that was well-articulated, yet the ventures did not have high levels of institutional support. Institutional conditions can create both enabling and constraining conditions for resource mobilization. Although it is easier for social entrepreneurs embedded in existing institutional structures to win legitimacy and gain access to standard resources, less embedded actors can still survive. By not being locked into existing institutional structures,

social entrepreneurs can engage in bricolage activities that challenge the rules and norms of existing institutional arrangements (Mair & Marti 2006). Higher levels of institutional support for a social venture make it easier to gain access to standard resources and financing. However, when faced with low levels of institutional support social ventures may still be able to mobilize resources by creatively engaging in bricolage. As a summary hypothesis for this section, I suggest that:

H2a: The level of institutional support will be negatively related to social venture bricolage activity.

H2b: The level of institutional support will be positively related to social venture resource-seeking activity.

In the following section, I contrast case examples from the Benetech study, with examples from the literature review of social entrepreneurship to illustrate in more detail the effect of political, regulatory, technological and human development institutions in mobilizing resources for a social venture. Figure 4.3 has examples of Benetech ventures and other social ventures that mobilize resources with and without institutional support. The examples of Benetech ventures and other social ventures illustrate how institutional support may affect the resource-mobilization process. Technology social ventures can be influenced by intellectual property rights, political risks, human development concerns and the level of business regulation for the given market.

Political support and resource mobilization: The Martus venture and Community Development Organizations.

Martus is an example of a technology social venture that operates in environments that have little local political support. The venture enabled social workers to document human rights violations by posting on secure internet server. As a result, the venture repeatedly tests the limits of local reporting and confidentiality standards in politically unstable countries. The Martus prototype was started with little external funding or institutional support and exhibits many characteristics of bricolage. Existing hardware from the Bookshare project was used to design the Martus prototype. The software was written by Patrick Ball, drawn from past his past experiences in programming and documenting human rights violations. In the absence of existing tools or products that served a similar function, the Martus team used self-taught skills and lessons from social workers and human rights activists in the field to complete the prototype. Case studies on the use of Martus in Russia and Colombia illustrate the political instability within which the venture operates.

> A growing cause for concern in the St. Petersburg region is the nuclear reactor at Sosvony Bor, less than 100 kilometers away from the city center. This reactor, which is of the same generation as Chernobyl, recently reached 30 years of age – time for its closure. Yet, citing energy demand, politicians have called for stretching its life of service. NGOs fighting against this have been

> harassed, and activists like Oleg Bodrov of Greenworld have been physically assaulted. Across Russia, in the Lake Baikal region, instances of sabotage abound: for example, an NGO recently had computers stolen from its offices. As a Martus user, much of the information was able to be recovered and documented (Martus 2006).
>
> Recently, a member of a human rights NGO was assaulted multiple times. Each attack focused on obtaining her computer. In one incident, her taxi was hijacked in Medellin, Colombia. She and her taxi driver were taken to a remote location where her computer, cell phone and other property was stolen, but she and the taxi driver were released unharmed. This NGO had many of its documents secured by Martus. Whoever stole the computer got nothing but encrypted bits for the data stored in Martus, and the NGO was able to recover their materials from a Martus backup server to their new computer (Martus 2006).

The Martus venture was started using internal funding, equipment and resources cobbled together from existing projects. Formal government and informal regulatory institutions in many countries acted against Martus. Under these conditions, the venture was developed using specifications cobbled together from informal reports and ad-hoc field interactions with end users. Martus is a classic example of a venture operating in politically risky regions. Such ventures are less likely to gain funding from capital markets as funding guarantees and operating conditions are both unstable (Henisz 2000). As political risk increases, social

ventures are less likely to acquire standard resources, and are forced to make do with existing equipment and untrained volunteers.

In contrast to the conditions faced by Martus, community development organizations often receive the benefit of institutional support. An empirical study of community development organizations demonstrated that social ventures that provided services (e.g. counseling, awareness and support for teenage truancy, substance abuse, public health, environmental protection or public safety) that were sanctioned or supported by public institutions were able to gain resources from granting organizations (Korosec and Berman 2006). Municipal government policy and regulations helped social ventures address social challenges in their communities. Based on a national survey of city administrators and in-depth interviews among jurisdictions with populations over 50,000, the authors found that municipal governments helped social entrepreneurs by 1) increasing awareness of social problems, 2) helping them to acquire resources, 3) coordinating with other organizations, and 4) implementing programs.

We see how the presence or absence of local political support can play enabling role in helping social enterprises mobilize resources. When the goals of social ventures are aligned with those of existing political institutions, their activities are viewed as legitimate and beneficial to the institutional structure. Consequently, social ventures that bridge or extend services offered by the local government to the community often receive government co-operation. Social enterprises that have the support of political institutions are more likely to gain

access to resources. In contrast, social ventures that adopt an activist approach and operate without local political support may be find it harder to gain access to external resources and indulge in more bricolage activity. I suggest that:

H3a: The lack of local political support will be positively related to social venture bricolage activity.

H3b: The presence of local political support will be positively related to social venture resource-seeking activity.

Technology support and resource mobilization: Bookshare.org & Intellectual Property Standards.

Technology social ventures develop and deploy technology to address a social need. These ventures may license component technologies from universities and businesses, or gain access to technology through patents. In some cases large for-profit technology companies donate or subsidize the technology used by the social venture, with the explicit agreement that the social venture operate in restricted, distinct markets. For example, One World Health and PATH, two medical technology social ventures each obtain subsidized patents and licenses from large pharmaceutical companies and in return, focus the social venture operation exclusively on economically underdeveloped regions. Technology social ventures can gain access to external technology only if the patent and technology appropriability regime is strong. When these institutions are strong, technology

companies are more likely to grant technology access to the social venture because the social venture is restricted from competing in the same markets. Consequently, when institutional support is high, we expect that technology social ventures will procure or license technologies from external sources. In contrast, in the absence of institutional support, technology social ventures are less likely to obtain external technologies, and more likely to seek alternative routes to development. The ventures may use technology components at hand and build their own technology, or employ open-source code that is freely available. The evolution of the Bookshare.org venture illustrates how the presence or absence of institutional support can affect how technology resources are mobilized.

The Bookshare.org project, an online library service for the blind was closely modeled after Napster, a peer-to-peer file sharing software. Napster functioned without regulatory support and ran into problems with intellectual property and copyright regulations, yet Bookshare embraced the concept of community file-sharing. During the early stages of Bookshare, there were few regulations or technology standards that guided design or development for the product. An interview with the founder of Bookshare illustrates the point:

> At the time Bookshare.org was started, there were no regulations supporting online library services for disabled people, yet the venture proceeded by making do with pre-existing materials from the Arkenstone project to develop a prototype. Scanners, screen-readers and character-recognition software that were part of prior

projects were assembled together to create the Bookshare file sharing service.

Bookshare.org was started using internal funding and equipment and resources cobbled together from existing projects. The venture made do with materials on hand, while at the same time tried to gain external support. The venture's main concern was gaining access to literary content from publishers. While publishers had standardized digital book content, they initially refused to make these standard resources available to Bookshare because of copyright concerns. The venture had to work with individual paperback books that were scanned manually by volunteers and then digitized. Intellectual property standards for disability access were unclear and most publishers were concerned that copyright materials would be widely posted on the web.

Then three events occurred that changed the intellectual property impasse. First, Bookshare.org received regulatory support in the form of the Chaffee amendment, a clause in the Digital Millennium Copyright Act that waived copyright restrictions for disabled people. Bookshare.org gained legitimacy by posting a notice on their website. When downloading a book from Bookshare.org, customers were reminded that they were on a regulatory edge with the copyright notice, "If you post this book on the internet, you screw the blind community. Don't do it" (Zuckerman, 2004). Second, Benetech developed credibility with the publishing community by removing e-books that violated copyright requirements

from the site and generally assuring publishers that it was not trying to put them out of business, but instead was trying to help the blind. Third, Bookshare.org participated in standards committees, and tried to make their product part of the standard. As a result, publishers granted Bookshare access to standard digitized content, and the venture shifted its focus away from making do with preexisting resources, and focused on growing through marketing and distribution. As regulatory institutions changed in support of the activities of Bookshare.org, the venture moved away from bricolage and started to seek standard resources and hire trained, professional employees.

H4a: Weak technology regulations (or intellectual property copyrights) will be positively related to social venture bricolage activity.

H4b: Strong technology regulations (or intellectual property copyrights) will be positively related to social venture resource-seeking activity.

Business regulatory support and resource mobilization: Clean-tech companies and the Route-66 Literacy venture.

Business regulation can play a large role in determining how social ventures mobilize resources. For example, the "non-profit" or "for-profit" designation of a social venture is strictly an Internal Revenue Service tax-code assignation for businesses. Yet the choice to incorporate a social venture as a non-profit or for-profit can constrain sources of funding. Most philanthropic

foundations only grant money to social ventures with non-profit status (cf Lasprogata & Cotton 2003). In contrast, investors are unlikely to invest in for-profit social ventures that do not have supra-normal returns (Austin et al 2006). Business regulation also played a large part in the development of clean-energy ventures. Dean and McMullen (2005) describe how entrepreneurs created clean energy ventures in the absence of business incentives to do so. Entrepreneurs challenged conventional wisdom to create wind-power companies, carbon-credit exchanges and green-building certification agencies. As these entrepreneurs succeeded in creating sustainable businesses, public perception changed, and regulatory institutions were reconfigured to provide economic subsidies and accommodate a new market. In this case when social entrepreneurship happened without the support of existing institutional arrangements, the creation of the venture in itself caused a change in the existing institutional arrangement. As institutional support became more widely available, the venture capital industry provided greater financing and support for ventures engaged in developing clean energy products. Universities also provided degrees in sustainable development and environmental engineering. As an overall effect, the creation of supporting regulatory and technology institutions promoted the wider availability of standard resources for the clean-tech entrepreneurs.

In contrast to the clean-tech energy ventures that were started without institutional support, the Route-66 Literacy venture in the Benetech incubator was started in an existing market for educational products with number of other players

and competitors. When referring to the educational market, the venture website states "Several for-profit players exist with well-established brands and long histories of providing reading tools for disabled students, but none compare strategically with Route 66 Literacy." The venture grew out of research conducted at the University of North-Carolina (UNC). Benetech partnered with a professor at the university to secure external funding to further develop the product concept. Research and development of the project was funded by a grant from the National Institute on Disability and Rehabilitation Research. Benetech also obtained a $50,000 grant from a California-based community foundation to develop a business plan for literacy technology. Resources for the Route 66/ALL-Link project were obtained externally. Product content and technology was obtained from UNC. Additionally, labor and skills were obtained from a computer science class at the university. A senior engineer mentioned, "We've got some funding to take what the computer science class comes up with and take it live on the web. It will still be a preliminary version which will need more funding and work to become a full product."

From the above two examples I suggest that social ventures that introduce products in existing markets where business regulation is strong, are more likely to gain external funding and seek external resources. Strong business regulation also helps product recognition through branding or legitimation. Standard resources are developed for ventures in that market and social ventures can gain access to the same resources. For example, product content and technology for the Route-66

Literacy venture were externally available from UNC. As a result, the social venture resorted to less bricolage and more seeking of external materials and university resources. Institutional support for the educational market made it easier for the Route-66 team to secure external resources for the project. I suggest that:

H5a: Weak levels of business regulation will be positively related to social venture bricolage activity.

H5b: High levels of business regulation will be positively related to social venture resource-seeking activity.

Human development and resource mobilization: The Grameen Bank and HRDAG.

Human Development is a comparative measure of life-expectancy, knowledge and income for countries worldwide. It is used by welfare economists (e.g. Anand & Sen 2000) as a standard means of measuring well-being. It is used to indicate whether a country is a developed, developing, or underdeveloped country and also to measure the impact of economic policies on quality of life. Since technology social ventures attempt to address a social problem in a sustainable manner, the level of human development in a region directly affects the extent of the social problem, and the venture's access to resources.

In regions with high levels of human development, institutions have the resources and a greater concern to address social needs. Social ventures that address social needs in areas of health, poverty or education are provided with

resources. Social ventures in regions with high levels of human development are thus more likely to gain access to the resources they need to address a social problem. Community development organizations, in Europe, the UK and the US, for example, often receive municipal support and funding to address economic development or carry out education programs in the local community.

In places where the level of human development is low, institutions place less importance on social needs, and often do not have the resources to address these needs. Social ventures in regions with low levels of human development are less likely to gain access to the resources they need to address a social problem. The venture has to find alternative methods and may construct resources through alternative methods (Sarasvathy 2006, Mair & Marti 2006). The founding story of the Grameen Bank is a well cited example of a venture that made do despite challenging institutional circumstances. Grameen Bank was started in Bangladesh, a country with a moderate – low level of human development, with high levels of poverty and low education.

> The initial Grameen microfinance community that tried to help poor Bangladeshi women start small businesses was denied financing from all major banks. Banks required a credit-history to obtain financing, and the community of poor women was not perceived as a legitimate credit-worthy client. The founder Mohammed Yunus then started the microfinance community using volunteers and his own credit and money, despite opposition from existing financial institutions. Yunus went against the popular institutional perception that poor people were not-credit

> worthy, and showed that the poor typically paid back loans at a lower default rate than the general population (Bornstein 2005).

If the regional level of human development is extremely low, (poverty and health problems are high), bricolage activities may not be viable for the social venture to mobilize resources. Under this condition in extremely penurious environments, materials at hand cannot be used, and volunteers may not be able to learn skills on the job. The only ventures operating in these regions may rely on external funding and resource-support. An illustrative example is the Benetech venture, Human Rights Data Analysis Group (HRDAG). HRDAG was started to detect international violations of human rights and provide statistical evidence of genocide and social injustice at the International court of The Hague.

> HRDAG conducted projects in regions with very low levels of human development including Chad, Sierra Leone, Afghanistan, Cambodia, Timor-Leste and El Salvador. Each of these regions had few resources to support HRDAG projects, and most support is provided externally, from the American Association for the Advancement of Sciences (AAAS) and other funding institutions. Seed-funding for the project was received from an external philanthropic foundation, the Richard & Rhoda Goldman Fund in the U.S to explore and develop intrinsic connections between environmental protection and human rights. Software engineers, a statistician and a networking expert with prior professional experience were hired to develop the project. The venture engaged in resource-seeking and obtained specialized labor and skills to complete the project.

In the case of HRDAG, the only way to operate in regions affected by genocide or mass-violations of human rights was to obtain resources from elsewhere. I expect to find a curvilinear relationship between the level of human development and bricolage activity.

At high levels of human development, social ventures can gain access to resources from local resource-providers. At low – moderate levels of human development, standard resources are scarce, but social ventures make do with the resources and volunteers at hand and engage in bricolage. At very low levels of human development there are few resources or even pre-existing material, labor or skills that can be used to develop the venture. As bricolage becomes improbable the only ventures that can operate are those that obtain resources from other regions.

H6a: The level of regional human development will have an inverted-U shaped curvilinear relationship to social venture bricolage activity.

H6b: The level of regional human development will have a U-shaped curvilinear relationship to social venture bricolage activity.

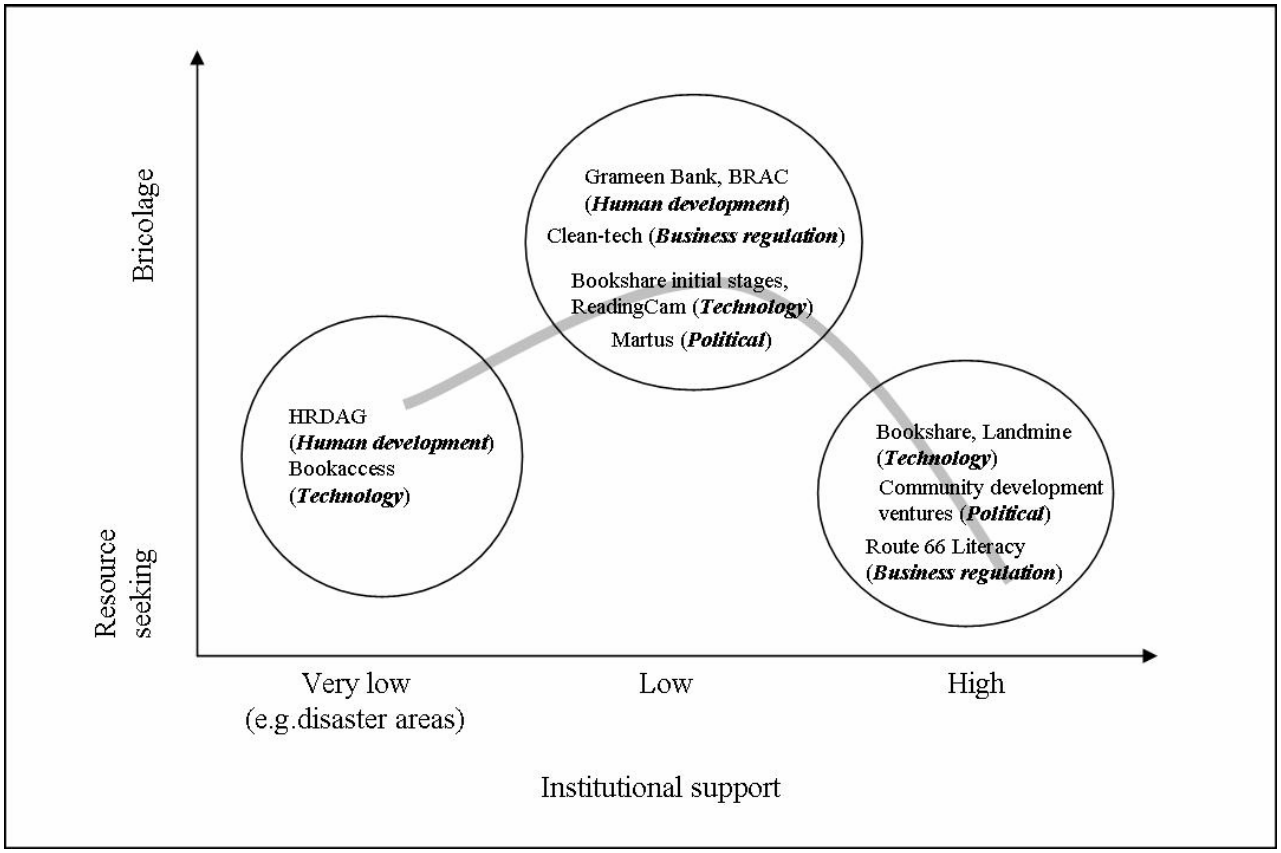


Figure 4.3: Bricolage and Resource seeking with varying levels of Institutional support[2]

[2] Type of institutional support is in parentheses.

4.4 The Market Scalability Model

How do external stakeholders shape the resource-mobilization process?

The actions of external actors - resource providers and users often influence the venture development process, and often determine the performance of the venture. For example, in a suggestive qualitative study of 33 Israeli social ventures, Sharir and Lerner (2006) concluded that the ability of a social venture to acquire the resources necessary to maintain program service and continuity depended primarily upon the entrepreneur's social network, and the ties established with other voluntary and public sector organizations. Studies of social ventures in the U.K, Ireland and the U.S also speak about the importance of ties between the venture and the community (cf. Korosec & Berman 2006, Shaw & Carter 2004, Wallace 1999). These studies emphasize the role of the community in providing resources to the venture, yet often discount the role that the community plays in directly shaping the development, the goals, and the outcomes of the social venture. Studies on social entrepreneurship and (on entrepreneurship in general) often promote the role of the individual social entrepreneur, and discount the role of the collective (Light 2005, Shane & Venkatraman 2003). When we include the role of external stakeholders, we see venture development as a mutual co-creation, a result of collective agency, rather than as the sole result of motive forces internal to the venture.

Studies of technology ventures have demonstrated the fragility of internal innovation efforts that fail to incorporate external stakeholders in the resource-

mobilization process (Garud & Karnoe 2003, Baker, Miner & Eesley 2003, von Hippel 2003). Ventures that rely solely on internal development efforts face the danger of being out of touch with customer needs and susceptible to the pressures of a changing environment. While internal bricolage activities can result in "brilliant unforeseen results" (Levi-Straus 1967: 17), they may be more conducive to value creation rather than value-appropriation. For example Baker and Nelson (2005) showed that ventures that used bricolage activity were able to create thriving small-businesses, yet these were often limited in their growth. Ventures employing bricolage became enmeshed in idiosyncratic routines that were well-suited to the initial community of practice, but were hard to adapt beyond that first community. I suggest that bricolage activity in itself is not sufficient to scale a technology social venture beyond the initial user-base. While bricolage is effective at creating "something from nothing" in the necessity of penurious environments, the idiosyncratic nature of using resources at hand may prevent a venture from "scaling" and growing into new geographic markets or user bases where the resources may be quite different. I suggest that:

H7: Bricolage will be negatively related to venture scalability.

Recent studies indicate that the agency of external actors may be particularly important to the development of technology social ventures. For example, Tongia and Subrahmanian (2006) argue that information and

communication technology (ICT) projects in the developed and developing world often lead to partial or total failures due to incomplete assessment of the problem being solved, and the metrics used to evaluate solutions. While the success of commercial ICT solutions in the United States are often determined by the market, with available infrastructure and market mechanisms, in the developing world the same institutional ecosystem does not exist. Social ventures often address a social need that is a result of failures of the institutional ecosystem.

Drawing upon in-depth case-studies of technology social ventures in southern India and in Costa Rica, researchers suggest that successful project deployment required an incorporation of stakeholders, pecuniary and non-pecuniary incentive structures and more importantly, their participation in the innovation process (Tongia & Subramanian 2006, Braund & Schwittay 2006, Kuriyan, Toyama & Ray 2006).

Studies of the innovation process often illustrate the role played by communities of users, regulators and resource providers in shaping the development of a technology (c.f. Garud & Karnoe 2003, Von Hippel & Von Krogh 2003 and Shah 2006). With regards to technology entrepreneurship, for example, Garud and Karnoe (2003) have used the term “involved” to connote external actors’ active participation in the development of the venture. The constitution of actors involved is not necessarily stable. Some actors may leave even as others become involved with a technological field. Even those involved, at

any point in time may have varying "levels of inclusion" with venture development (Bijker 1987, Garud & Karnoe 2003).

Drawing upon examples from the Benetech ventures below, I illustrate how resources are mobilized as a variety of external actors become involved with the venture. These actors do not play a passive role as resource providers, but often play a part in mutually co-shaping the technology social venture. Following Garud and Karnoe (2003) I define "collective agency" as the participatory actions of external actors in the venture development process. These actors can include resource providers, suppliers, users and regulators. In the following section, I illustrate how the focus of external actors can change or grow the venture. We see that venture scalability is often not a linear process dictated by the management team, but rather results from a mutual co-shaping by the interests of the grant providers, technology providers, users and other actors.

Bookshare.org scales into new markets: The collective agency of external funders.

Bookshare.org started out with an initial user-base of blind, tech-savvy users with an interest in computer books. The venture mobilized resources using bricolage, making do with pre-existing materials at hand. Computers, software development, scanners and screen-readers were obtained from the old Arkenstone project. At this stage, growth depended upon the literary content provided by volunteers and donors. Through an agreement with the O'Reilly Publishing

Company, the venture obtained access to an entire collection of books on computer software. The website offered a library of 15,000 books, mostly in English and many with technical content. However, individual user subscriptions for technical books were insufficient to sustain the venture financially on an ongoing basis. Consequently, by July 2003, Bookshare.org sought additional funding for venture development and growth. A senior executive mentioned:

> Soon after, a grant was received from the California Community Technology Foundation to expand the service to Spanish. The grant-provider's focus on Spanish literacy moved Bookshare.org into a domain that it had not previously considered, as it started providing content in multiple languages. The project also received $195,000 grant from the Lavelle Fund for the Blind to support New York metro area blindness-focused outreach, and a $25,000 grant from the NEC Foundation to support learning disability issues in K-12 school programs. The venture began working with universities and schools to extend the reach of Bookshare to disabled students. This funding resulted in broadening the scope of the project again, to accommodate the interests of these new funders.

In this example we see that funders not only provided money for the project, they also had an effect on which product markets and users bases were targeted by the venture. From the initial user target of print disabled individuals, the Bookshare

project expanded to include Spanish content, K-12 programs, and then colleges and universities. In addition, the agency of external funders allowed Bookshare.org to expand its collection to include newspapers, periodicals and even the New York Times bestsellers list. Here, the collective agency of funders moved the project beyond the initial market of technical-savvy blind users, into a broader educational market of learning disabled-students in colleges and universities. Collective agency affected venture development by exposing the venture to new markets that were not visible through the initial bricolage process.

Bookaccess ventures into uncertain geographic territory: The collective agency of partners.

Bookaccess was started as a Benetech venture that intended to leverage Bookshare technology and benefit students in the developing world. The Bookaccess team initially partnered with a university consortium based in Mississippi that was interested in providing literary content to schools in Africa. By early 2004, the initial market plan was to address the needs of a university in Angola. However, by May 2004, U.S. government agencies expressed great interest in contracts for reconstruction efforts in Iraq. Bookaccess ventured into new territory and partnered with USAID. The venture received funding to build library content in Iraq.

The management team started working to deliver journals, textbooks and reference books for the departments of medicine, nursing and public health /

sanitation at the University of Mosul in northern Iraq. However, by late 2004 the project was impacted significantly by the escalating violence in Iraq. The technology infrastructure in Iraq was incapable of handling an online digital library. So, in order to achieve the Bookaccess original proposal of library content, Benetech shipped 3000 pounds of books in a shipping container from various publishers around the U.S. to Iraq. A senior executive mentioned:

> The management team's original goal for the project was to design a test-bed for rights acquisition, customer content needs and technology requirements to serve underserved communities, partner libraries, universities and community centers around the world. However, our partner's [USAIDs] focus on Iraq moved the project away from developing digital library software and into logistics, customs brokerage, shipping and labeling. Investor focus had a strong impact on the direction of the project, and the Bookaccess program was terminated despite continuing investor interest (Carter, 2005).

In this example we see how the participative actions of partners moved the Bookaccess project first toward Africa and then toward the Middle East. By providing resources and dictating the need for certain resource-mobilization activities (e.g. logistics provision and paperback shipping for Iraq), the venture learned a lot about different laws in each country, and about operating

internationally. The collective agency of partners moved Bookaccess into new institutional contexts and new geographic markets far beyond the expectations of the venture team.

Martus expands across sectors and geographies: The collective agency of users.

The Martus project started as a social venture that documented human rights violations. The initial idea originated from the founder's professional background in optical pattern-recognition, but changed after an encounter with experienced technologists at a human-rights social venture conference. Initial thoughts of documenting human rights violations via sophisticated technological solutions like satellite imagery and spy drones were foregone for a more practical approach after talking with human rights groups. The Benetech team found that field workers did not want fancy technology; they had a hard time managing text and online access was slow and expensive. For instance, field-workers in Sri Lanka, described how they had stored paper documents in a shed… and a termite attack had destroyed seven years work on documenting genocide attacks (WAC 2004). Following user descriptions of the immediate problem at hand, the Martus team started to develop a secure email documentation tool that could encrypt information and then store it remotely on a secure server. A senior executive mentioned:

> Volunteers in the Philippines and the U.S worked with the Martus prototype to refine the user interface. With no advertising, and limited

> announcements at conferences, the project continued to expand and develop a large user base. By January 2004, after eleven months of operation, Martus was deployed, adopted and used regularly by NGO's in over ten countries including Afghanistan, Guatemala, Peru, the Philippines, Sierra Leone, Sri Lanka, Uzbekistan and the U.S. By early 2005, the user interface had been translated into Spanish, Russian, Arabic, French and Thai.

In reflecting upon the new extensions of Martus, the executive mentioned:

> Over time, the success of Martus will be measured by the depth and breadth of penetration achieved across an extensive array of issue areas and geographies. Martus is currently applied to areas of social justice, including human rights, political rights and violence against women. User-driven applications of Martus include the monitoring and reporting of other issues such as human trafficking, environmental destruction and hate crimes based on gender, orientation or religious persecution.

In this example, we see how the collective actions of users helped expand Martus into new markets. As additional organizations downloaded and adopted Martus for their information management needs, the community of existing Martus users assisted new users in the adoption period with only a basic level of support from Martus staff. Martus users directed the project into environmental protection,

women's rights, taking it into new areas of documentation and reporting. Users also innovated to take the product into different languages thereby attracting other users. The collective agency of users moved the venture into previously uncharted markets. Here, collective agency appears especially salient when a variety of users participated in the development of the technology social venture.

The development of a new technology is a process that progressively builds upon the inputs of the many people involved. Not only do these people engage with the technology, but also with one another. In the process, these actors create opportunities for learning. Eventually, the knowledge that is generated from these learning opportunities becomes embodied in the actors and embedded in emerging artifacts. This accumulated knowledge serves as a platform that enables and constrains the activities of the many involved. In other words, actors shape the development of a technology which in-turn shapes them. Thus, human agency, besides being distributed over time and space, is embedded in emerging knowledge and social structures as well (Garud & Karnoe 2003). Technology development is thus an act of collective bricolage.

The Benetech ventures often relied upon a network of external actors to mobilize resources and develop projects, sometimes unsuccessfully and at other times, to good effect. In each case, external actors played a role in venture development (Figure 4.4). Whether as users who dictated product specifications, volunteers who provided product content, or as resource providers who gave funds,

or in-kind donations of software and hardware, external actors often contributed to the emerging knowledge and social structures of the venture.

For example, the level of internal bricolage activity changed depending upon the interests and participation of external actors and resource providers. Collective agency played a role in venture scaling by introducing new knowledge and resource-environments to the venture. I propose that as external actors co-shape the content, technology, and goals of the venture, their collective agency will lead the technology social venture into new markets and help scalability.

H8: Collective agency will be positively related to venture scalability.

The participatory actions of users, regulators and resource providers can bring new insights and can weaken the idiosyncratic routines that are part of the internal bricolage process (Garud & Karnoe 2003). Whether as users who dictate product specifications, or volunteers who provide product content, the collective agency of external actors introduces the venture to new knowledge and resource environments. As external actors co-shape the content, technology, and goals of the venture, their participation can lead the social venture into new markets.

H9: Collective agency will weaken the negative relationship between bricolage and venture scalability.

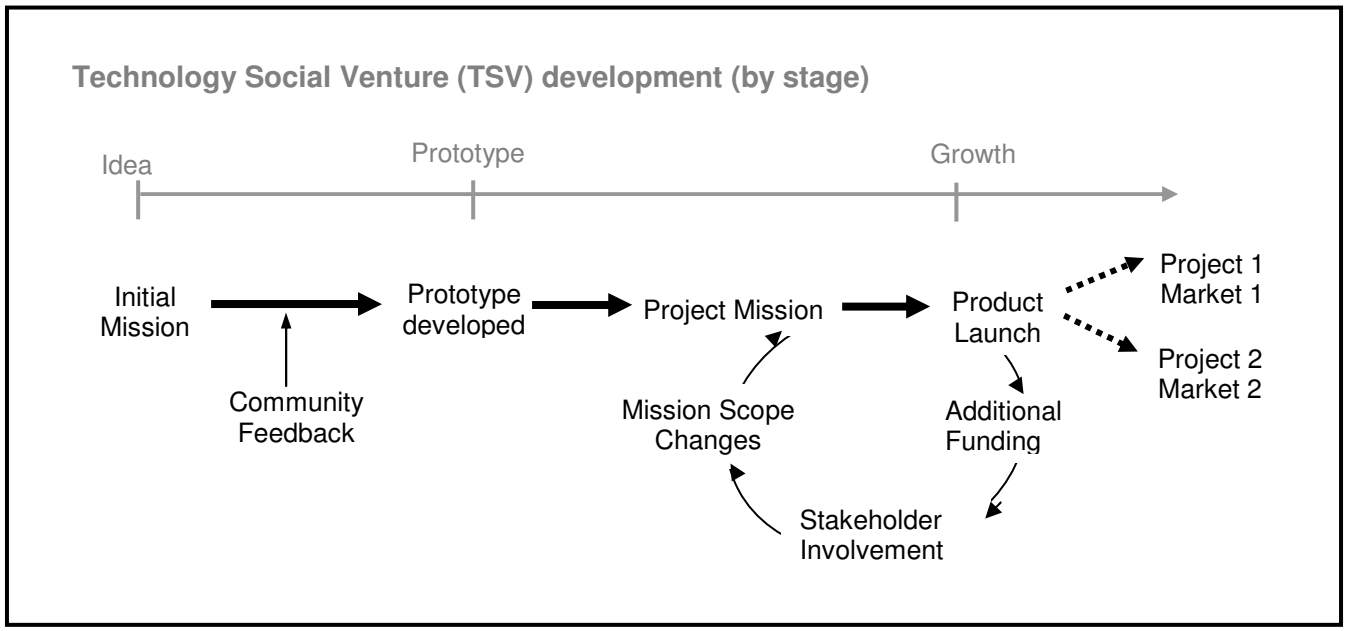


Figure 4.4: The effect of collective agency on venture development.[3]

[3] Management team and external stakeholders co-shape the TSV to scale the venture.

4.5 Conclusion

This chapter provided insight into resource mobilization within technology social ventures. Using a case study of eight projects within the Benetech incubator, I illustrated conditions under which technology social ventures can grow or fail in resource limited conditions. I theorized that under certain conditions social ventures might pursue bricolage as a solution to resource mobilization. These conditions include the source of initial funding and the level of institutional support. I also proposed that while bricolage may be effective as an initial source of value creation, it may not necessarily relate to venture scalability. Collective agency, the participative actions of external stakeholders, moderates the relationship between bricolage and venture scalability. In the following chapter I test these hypotheses on a sample of technology social ventures.

Chapter 5: Large Sample Research Methods

5.1 Introduction

In this chapter I discuss the research methods to be used in the quantitative analysis. The chapter is organized into three sections. The first describes the sample that I used to test my hypotheses. The second looks at the variables and their operationalization. Here, I discuss the reliability and validity for the dependent variables, "bricolage" and "resource-seeking," that describe the process of resource-mobilization. In the third section I specify the regression models used to empirically test and validate the hypotheses described in Chapter 4.

5.2 Sample Description

I selected a sampling frame of all ventures in the technology social venture database maintained by the Technology Museum of Innovation (TMI) in San Jose, CA. The TMI database is the most comprehensive professionally evaluated source available for ventures engaged in technology social entrepreneurship, the phenomenological context of this study. The ventures in this database apply technology to solve social problems in the sectors of education, equality, environment, health, and economic development. These sectors are classified by the Millennium Project[4] of the United Nations as principal areas that are representative of social enterprise activity.

[4] In September 2000 the largest gathering of world leaders in history adopted the United Nations Millennium Declaration to reduce extreme poverty, hunger and disease and set out a series of time-bound targets called the Millennium Development Goals (MDGs). The Millennium Project was

TMI applicant selection Procedure: The TMI sends out a call for applications to 160 United Nations program development offices around the world. Each office announces the application process to the local community of individuals, corporations and NGO's that are engaged in social entrepreneurship. A panel of domain experts then evaluates each received application and solicits more information from ventures that match the principle selection criteria — that the venture has developed and deployed the technology in the field. The selection process is conducted by an independent panel of scientists or expert practitioners in their field. Panelists evaluate ventures based upon two criteria. First, there must be a measurable impact on urgent social/humanitarian concerns. The venture's social impact must demonstrably exceed the base level of what's practiced in the local community. Thus, while the venture may not necessarily deploy an advanced technology, it is often a technology that helps the local community. For example, applications that come from developing countries include low-tech solutions to water sanitation or safe drinking water.

The second criterion is whether the technology can be replicated with the potential to scale. The evaluation of impact based on the above criteria is independent of the resources or initial endowments possessed by any specific

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commissioned by the United Nations Secretary General in 2002 to develop a concrete plan to address these goals. The goals included extreme poverty in its many dimensions-income poverty, hunger, disease, lack of adequate shelter, and exclusion-while promoting gender equality, education, and environmental sustainability. They also included basic human rights-the rights of each person on the planet to health, education, shelter, and security. The project comprised 10 thematic task forces made up of 250 experts from around the world including researchers and scientists; policymakers; representatives of NGOs, UN agencies, the World Bank, IMF and the private sector. The Tech Museum of Innovation adopted the Millennium Project framework in assigning sectors of social enterprise activity (www.techawards.org/about).

venture. The selection process is supported by due diligence research on the social ventures by two independent researchers at the TMI.

Sample Size: I adopted the TMI application database for 2005 for my large sample test. The year 2005 is the first year for which the applicant ventures were asked and granted research consent. This database included 249 ventures. My final dataset contains venture data on 202 of the 249 applications. These ventures operate in 57 countries and are started by individuals, for-profit private and public companies, and non-profit organizations. I excluded 47 venture applications for three reasons. First, five applications did not represent a founded venture but merely an idea. These applications did not qualify as technology social ventures. Second, venture level data on 25 ventures was hard to obtain because the venture application was incomplete, and the ventures were small, private organizations for which information was not publicly available. Third, 23 ventures operated in countries for which one or more institutional variables were not available.

5.3 Data Sources

The primary source for venture-level variables is the TMI database. The application forms submitted by the ventures provide descriptions of 1) whether the technology is new, or a pre-existing technology applied to a new application, 2) the resources used to develop the technology product, 3) performance measures and the venture's ability to scale, and 4) Foreseeable problems with institutional support. Appendix D provides the application questions to which each venture responds.

I supplemented TMI application form data with data from venture websites. Approximately 90% of the ventures have websites with information on venture founding, product, and venture history. In cases where the website changed or was no longer available, I included data from an archive of the venture's website available at the Internet Archive (www.archive.org).

The dataset contains both for-profit and non-profit ventures. For non-profit ventures, I obtained venture-level information from Guidestar, a provider of data from IRS Forms 990 and the IRS Business Master File, including comprehensive facts on employee compensation and grant activity. I also read through individual IRS Form 990 records and venture-annual reports for information on current resources and employees. For for-profit ventures, I obtained resource information from Hoovers for publicly traded companies and from VentureXpert for private companies. Hoover contains financial and company size information on 23 million businesses. *VentureXpert* contains information on venture funds, private firms, executives, venture-backed companies, and limited partners, as well as analytic data on fund commitments, disbursements, statistics and performance. I cross-checked U.S and Canadian company information with ReferenceUSA, a reference database containing information on 14 million U.S. businesses and 5 million Canadian businesses. I cross-checked European and South American company information with either Kompass, MergentOnline or EBSCO Business source complete. In the following section, I outline the variables and measures used in this study.

5.4 Variables and Measures

In this section, I describe the dependent, independent and control variables to be used in this study and their operationalization. The dependent variables include bricolage, resource seeking, a composite measure of resource mobilizing, and market growth. The independent variables include seed-funding source, institutional support and collective agency. A summary of variables is provided in Table 5.1.

Table 5.1: Variables and Measures: Dependent Variables

Variable	Definition	Measure	Value	Source
Bricolage (b_total)	Applying combinations of existing resources within the venture	Evidence of using existing Materials (1/0), Labor (1/0), Skills (1/0)	0-3	Tech Awards Judging Rubric Venture websites: Founding, History, Operations pages.
Resource Seeking (r_total)	Seeking new resources external to the venture	Evidence of ordering new Materials (1/0), Labor (1/0), Skills (1/0)	0-3	Tech Awards Judging Rubric Venture websites: Founding, History, Operations pages.
Market Replication (mrep_c)	Entry into distinct markets	Count of entry into new demographic or geographic user bases	Positive integer	Tech Awards Judging Rubric: (Replication potential, Measurable Results questions) Venture Websites: Users page

Table 5.1 (contd): Variables and Measures: Independent Variables

Variable	Definition	Measure	Value	Source
Source of Seed Funding (sf)	External or internal founding investment in the venture	A categorical variable composed of Founder money, Parent organization funds, External Investment, External Grant, Combinations of internal and external.	0-4	IRS Tax Forms 990, Guidestar, Reference USA, Venture website: Founding History
Collective Agency (ca_total)	Evidence of external actor contributions to the venture. (investors, users and other collaborators)	A count variable, composed of partners as investors (1/0), users (1/0), technology collaborators (1/0)	0-3	Tech Awards Judging Rubric: Other's contribution, Credentials from external Letters of Reference. Venture Website: Partners page
Institutional support for technology (tai)	Ease of creation & diffusion of technology and creation of a human skills base	Composed of four components: 1) Patents granted, diffusion of 2) old (telephone) and 3)new (internet) innovations, 4) Creation of human skills base (education)	Cumulative Percentile score from 0 to 1	United Nations Technology achievement index

Table 5.1 (contd): Variables and Measures: Independent Variables

Variable	Definition	Measure	Value	Source
Institutional support for human development (hdi)	Level of human development within a given country	Composed of three components: 1) Life expectancy, 2) Education and 3) GDP	Cumulative Percentile score from 0 to 1	United Nations Human Development Index
Political support (pol)	Level of political stability within a given country	The POLCON measure (Henisz 2002) identifies the number of branches of government with veto power over policy change.	Cumulative Percentile score from 0 to 1	POLCON (Henisz 2002) available for 234 countries for each year.
Regulatory support (ease)	Institutional regulatory support for doing business in a given country	Composed of ten components based on surveys: 1) Starting a Business, 2) Dealing with Licenses, 3) Employing Workers, 4) Registering Property, 5) Getting Credit, 6) Protecting Investors, 7)Paying Taxes, 8) Trading Across Borders, 9) Enforcing Contracts, 10) Closing a Business	Cumulative Percentile score from 0 to 1	World Bank Rankings: www.doingbusiness.org

Table 5.1 (contd): Variables and Measures: Control Variables

Variable	Definition	Measure	Value	Source
Size	Size of the organization	Size measured by no. of employees (0-20, 20-100,100 or more)	0-3	Guidestar (for non-profits) Hoovers (for-profit public), ReferenceUSA (for-profit private) Venture Website
Venture Age (org_age_yr)	age of the venture	No. of years since founding of organization	positive integer	Venture website: Founding page Guidestar (non-profits), Hoovers (for-profits), Internet Archive
Venture Type (org_type)	type of venture (for-profit, non-profit, individual)	Dummy variable for each type of venture in database	0-3	Tech Awards Database

Table 5.1 (contd): Variables and Measures: Control Variables

Variable	Definition	Measure	Value	Source
Founding Location (Country_fnd)	Country in which venture was founded	Dummy variable for each country in the sample	0/1	Tech Awards Database Venture website: Founding page
Product Age (proj_age_yr)	Product age	No. of years since development of product	positive integer	Venture website: history, product pages
Sector (award_ca)	type of social sector in which venture was formed	Dummy variable for each of Five social sectors: Economic Development, Equality, Health, Education, Environment	0/1	Tech Awards Database

5.4.1 Dependent Variables

Bricolage and Resource seeking

The variables that address resource mobilization are bricolage and resource-seeking. Bricolage is defined as making do with existing resources, and creating new products from the tools and materials at hand. In contrast, resource seeking is defined as procuring standard external resources and assembling them to create new products. I also created a composite measure for resource mobilization from the bricolage and resource-seeking scores. Bricolage and resource seeking are operationalized using content analysis of venture data from the TMI application form and the venture website.

I measured the level of bricolage and resource seeking on three dimensions: materials, labor and skills. Table 5.2 provides descriptions for each dimension. Prior literature (Baker & Nelson 2005; Baker, Miner & Eesley 2003) has used these dimensions to identify areas of bricolage activity. To construct the *bricolage* and *resource-seeking* variables, I collected data on venture founding from the tech museum application forms. This data was corroborated with the venture founding or history page on the venture website. Two independent coders rated whether the venture engaged in bricolage or resource-seeking on each of three dimensions: materials, labor and skills.

I measured bricolage as a count variable from 0 to 3, where a score of 0 indicates absence of bricolage activity, and 3 represents bricolage activity along all three dimensions of material, labor and skills. Similarly, I measured the level of

resource-seeking, where a score of 0 indicates absence of resource-seeking activity and 3 represents resource-seeking activity along all three dimensions of material, labor and skills. Bricolage and resource-seeking are treated as independent activities. Thus, while an activity can be either bricolage or resource-seeking, a venture may undertake multiple activities to mobilize resources. For example, a venture making wooden fire-logs may choose to use waste sawdust at hand as the input material, yet in addition buy professionally designed press-equipment to manufacture the wooden bricks. While the use of waste sawdust is evidence of material bricolage ("a discarded material with new use"), the use of professional manufacturing equipment is evidence of material resource-seeking ("standard components designed for the project"). This venture receives a score of 1 on both the material bricolage and material resource-seeking dimensions. I also constructed a resource-mobilizing composite variable consisting of the sum of bricolage and reverse coded resource seeking. This variable treats bricolage and resource seeking as resource-mobilization activities along a continuum. $Resource\text{-}mobilizing_{composite}$ takes on values from 0 to 6, with 0 indicating more resource-seeking and 6 indicating more bricolage. A score of 3 on this composite scale indicates equal levels of bricolage and resource-seeking activity.

Construct Validity: While the bricolage and resource-seeking constructs have been identified in prior literature (e.g. Baker & Nelson 2003), this dissertation is the first attempt to operationalize these constructs on a large sample. Consequently, an important consideration in operationalizing bricolage and

resource-seeking, is construct validity and reliability (Venkatraman & Grant 1986). I outline the steps taken toward content validity, unidimensionality, convergent validity, discriminant validity and reliability.

Content validity is the extent to which the empirical measurement reflects a specific domain of content. Venkatraman and Grant (1986) suggest that use of the same construct by peer researchers is an indicator of the face validity of the construct. In order to capture the domain of bricolage and resource-seeking constructs, I use the same operational definitions used by scholars in the field (e.g. Baker & Nelson 2005, Baker, Miner & Eesley 2003, Baker 2006, and Ciborra 1996).

Unidimensionality is the extent to which the items reflect one underlying construct. Materials, labor, and skills items have been identified as distinct resource dimensions for new ventures (e.g. Wernerfelt 1984, Shane 2003). The process of "making do" or "seeking new" represents the commonality along each dimension and may be used to identify an activity as bricolage or resource-seeking (Baker & Nelson 2005, Baker 2006). A factor analysis of the material, labor and skills dimensions indicated that they represent the same underlying construct, with all three items falling on a single factor (eigenvalue = 0.72).

Convergent validity is the degree to which multiple attempts to measure the same concept with different sources are in agreement. To test for convergent validity I used multiple sources of data including Tech Award application forms, websites, annual reports and press-releases on a sub-sample of 30 ventures.

Discriminant validity is the extent to which a concept differs from other concepts. The bricolage concept has a theoretical overlap with improvisation. However, they do not represent the same construct, because time is a critical factor in the definition of improvisation - the degree to which design and execution converge (Miner 1996) while time is not a critical factor in the definition of bricolage (Cunha, Cunha & Kamoche 2004). Bricolage can also overlap with bootstrapping (Winborg & Landstrom 2001), since items on the bootstrapping scale (e.g. joint utilization, customer treatment) may relate to bricolage. However, there are at least three distinct differences which distinguish bricolage. First, bootstrapping does not address 'skills', whether the know-how comes from self-taught skills, from technical education or prior professional work experience. Second, bootstrapping extends to fiscal management (e.g. use of credit cards), but bricolage does not explain how money gets used. Third, bootstrapping is not theoretically grounded, but is a collective set of activities commonly seen in start-up ventures. Consequently, bootstrapping has theoretical overlaps with bricolage and with resource-seeking. In contrast, bricolage is grounded in a theoretical explanation (Levi-Straus 1966) of how existing resources may be used to create a product.

Reliability refers to an absence of measurement error in the cluster score. For content analysis the clarity of category definitions (e.g. bricolage) can be refined by coding a small sample of text (Weber 1985, Krippendorff 2004). Testing led to insights that refined the classification scheme. I first documented resource-

mobilizing activities for the initial set of eight ventures from the qualitative study on Benetech (Appendix C). An independent reviewer evaluated the documented description of each activity as bricolage or resource-seeking. Initial inter-rater agreement for bricolage and resource-seeking was 86%, (Krippendorff's alpha = 0.75). I refined the measures of bricolage and resource-seeking two resolve disagreements between myself and the independent reviewer. A re-test of inter-rater agreement for measuring bricolage and resource-seeking was 90%, with Cohen's Kappa = 0.81 (Krippendorf's alpha = 0.81). Two additional independent raters coded 228 descriptions of resource-mobilizing using the new definitions. Inter-rater agreement on this set resulted in a measure of Cohen's Kappa =0.77 (Krippendorf's alpha = 0.77). These levels of Krippendorf's alpha (and Cohen's Kappa) may be considered sufficient in content analysis that identifies early stage constructs (Fleiss 1971, Cohen 1960, Krippendorff 2004).

Market-Scalability

Market scalability represents entry into new markets, beyond the initial customer base. I selected market scalability as a measure of growth and social impact, based upon the literature review (see Chapter 2.2) on social entrepreneurship performance metrics[5]. The market scalability metric has particular value for social ventures for two reasons. First, social ventures are often concerned with scaling social impact,

[5] Performance is harder to assess for social ventures than for traditional commercial ventures. There is no single metric that describes social impact (Paton 2005). Further, since for-profit and non-profit ventures are both included in the sample, revenue metrics are not comparable across ventures. Non-profits do not measure a return on investment (ROI) or a return on assets (ROA).

more than with the revenue growth of the enterprise (Sherman 2006). Market scalability represents a direct measure of the social venture's ability to scale the social product or service to new populations. Second, social ventures (and especially technology social ventures) are concerned with economies of scale, since the marginal costs of serving additional customers falls as the venture scales (Shapiro & Varian 1998). Operating costs can also be spread across a larger number of constituents (Boris & Steuerle 1999). I measure market scalability as the number of countries in which the venture had both a product and a local customer base (as of 2007). Market scalability data was obtained from the venture application forms and from the venture websites. For ventures that had a presence exclusively on the internet, I measured scalability as the number of countries which made up more than 4% of the total audience. I obtained usage statistics from Alexa which provides information on web-traffic.

5.4.2 Independent Variables

Seed funding source: For each venture I measure the source of initial funds as being internal or external to the organization. Seed funding sources are coded for each venture as 1= Founder-financed / no funding, 2 = Parent Organization financed, 3 = External Investor, 4 = External Grant. 1 and 2 represent internal sources of funding, while 3 and 4 represent external sources of funding.

Institutional support: Technology social ventures are situated at the nexus of regulatory, economic, and technological institutions. By developing and deploying a technology to meet a social need, the TSV can be influenced by institutions that govern technology development, business development, as well as human development. Consequently, for each organization, I measure institutional support as the sum of four dimensions:1) The regulatory ease of doing business (*Regulatory support*), 2) The political stability of the country in which the venture was situated (*Political constraint*), 3) The country level of technological achievement (*Technology support*) and 4) The level of human development (*Human Development*). The four dimensions are described below in more detail.

Regulatory support: I measure the institutional regulatory support for doing business in a given country using the World Business Rankings (cf. Reiter 2006). The rankings result in a cumulative percentile score from 0 to 1 and are composed of ten survey based-components: 1) Starting a Business, 2) Dealing with Licenses, 3) Employing Workers, 4) Registering Property, 5) Getting Credit, 6) Protecting Investors, 7)Paying Taxes, 8) Trading Across Borders, 9) Enforcing Contracts, and 10) Closing a Business. The World Business Rankings are developed by economists at the World Bank and is comparable to other rankings on institutional regulation (e.g. World Economic Forum, European Bank for Reconstruction and Development) for the ease of doing business in a country. In addition, the World Business Ranking has specific components (e.g. starting a Business, getting credit, and protecting Investors) that are directly applicable to nascent ventures (Djankov,

LaPorta, Silanes & Shleifer 2002). TSVs form a subset of all ventures since they are constrained by the same business criteria in their founding.

Technology support: is measured by the growth competitiveness technology index, a composite measure developed by the World Economic Forum to capture the institutional support in creating and diffusing a technology and in building a human skills base (Porter et al 2005). The index is weighted to indicate that the role of technology in the level of institutional support depends upon the country's particular stage of development. The index ranks countries on a comparative global scale and aims to capture technological achievements of a country on three dimensions: 1) innovation -- creating new technology; 2) technology transfer -- diffusing the adoption of new technologies; and 3) information and communications technology adoption– the prevalence of internet, cell-phone and laws governing the same.

Human Development Support: I use the human development index (HDI), a measure of institutional support for human development within a given country. Human development is defined as "the process of enlarging people's choices" and is considered to be "more than the expansion of income and wealth" (UNDP report 1990: 10). The report acknowledges that while in principle people's choices can be infinite and changing over time, there exist three human preferences at all levels of development: 1) to lead a long and healthy life, 2) to acquire knowledge, and 3) to have access to resources for a decent standard of living. The HDI was developed as an expanded measure of social welfare, beyond economic output (Anand & Sen

1994). The components of the HDI include health, education and economic development. This measure has been used extensively in United Nations Reports on national development, and is often assumed to better represent local sustainable development than the traditional economic measure of gross domestic product (Sagar & Najam 1998).

Political Constraint: I use Henisz's (2003) measure of political constraint to measure the level of political stability associated with the social venture. This measure is widely used in entrepreneurship and international business research to measure the local political climate for investing in ventures (e.g. Ahlstrom & Bruton 2006; Makino, Isobe & Chan 2004). This measure of political constraint estimates the feasibility of policy change (the extent to which a change in the preferences of any one actor may lead to a change in government policy). This measure is coded at the country level and uses the following methodology. First, data from political science databases is used to identify the number of independent branches of government (executive, lower and upper legislative chambers)[6] with veto power over policy change in [234] countries in every year [that they existed] from 1800 to [2005]. Next, the preferences of each of these branches and the *status quo* policy are assumed to be independently and identically drawn from a uniform, one-dimensional policy space. This assumption allows for the derivation of a quantitative measure of institutional hazards using a simple spatial model of political interaction.

[6] Previous derivations of the political constraint index described here have included an independent judiciary and sub-federal political entities for a total of five potential veto points. Data limitations preclude their inclusion here. The effect of their omission will be to diminish the variance among countries with relatively high levels of political constraints thereby dampening the magnitude of the observed effect.

Collective Agency: I define collective agency as the participatory actions of external actors in the development of the venture (Garud & Karnoe 2003, Baker, Miner & Eesley 2003). Collective agency implies greater involvement in venture activities than simple arms-length transactions. For example, one dimension of collective agency is the involvement of users in the innovation process (von Hippel 2003, Shah 2006). Technology social ventures attract different constituencies of external actors, including funders, technology partners, and users. Often in early stage ventures, and especially in non-profit organizations, alliances and user involvement have the characteristics of informal exchanges with few press-releases or formal announcements. Yet, researchers studying technology ventures consider the collaborative participation of the local community as essential to the development of the venture (Kuriyan et. al 2006, Braund & Schwittay 2006, Garud & Karnoe 2003). From the case study on Benetech (Chapter 4), we observed how the collective agency of external actors can influence the resource-mobilization process.

I constructed the collective agency measure from two data sources. Primary data was from the letter of recommendation provided with the venture application forms. These letters of recommendation describe the role that external actors played in the development of the venture. In addition, the 'Partners' page of the venture website often provided additional information on the participation of external actors. Following Garud & Karnoe's (2003) conceptualization of collective agency,

I coded the participation (1/0) of actors in seven different categories: 1) Technology partner, 2) Suppliers, 3) Customers (or beneficiaries), 4) Funders, 5) Distribution partners, 6) Discussion Groups, 7) Standards bodies (or regulators). Each venture was then assigned a cumulative collective agency measure ranging from 0 to 7.

5.4.3 Control Variables

Firm Size: Prior studies have shown that larger firms are more adept at mobilizing resources than smaller firms (Aldrich 2003). Banks and funding agencies are more likely to provide financing to larger organizations with an established track record. Further, the likelihood of disbanding for small businesses is strongly associated with their initial size (Burderl et al 1992). I control for firm size, by measuring the number of employees involved in the parent organization. I obtain firm size information, a continuous variable, from the venture websites or from Guidestar, Hoovers, and ReferenceUSA.

Venture age: Population ecologists have empirically demonstrated that older firms are more likely to survive and obtain resources than younger firms (Aldrich & von Glinow 1992). Theoretically, the liability of newness (Stinchcombe 1965) increases the mortality rates for new firms, making it harder for them to mobilize resources. I control for venture age by adding a continuous variable for the number of years since founding. Depending on the type of venture, I obtain venture age information from the venture website, from Guidestar, Hoovers or ReferenceUSA.

Product age: Product age may be associated with the level of collective agency. For example, Shah (2006) demonstrated that early-stage products are more likely to have user participation in the development process than later stage products. In contrast, the longer a product is available, the more likely it may be that an ecosystem of technological partners influences the product development process (Shapiro & Varian 1998). I include a control variable for the age of the product measured in years from the date of introduction. I obtain product age information from the venture website and the Tech Awards application form.

Social Sector: I control for the social sector associated with the venture by including a dummy variable for each sector: Health, Education, Environment, Equality, and Economic Development. I obtain data for this variable from the Tech Awards application forms. Institutions may provide greater support mobilizing resources in some sectors. For example, the health sector has traditionally gained more support from the World Bank, Government agencies and the United Nations than the environmental sector (UNDP 2001). The Tech Awards application form lists the sector associated with each venture.

Venture type: Non-profit and for-profit ventures may have different sources of funding and support. For example, non-profits are more likely to seek grants while for-profit ventures are more likely to seek small business loans or venture funding

(Lasprogata & Cotton 2003, Gair 2006). I include a control dummy variable for venture type (Non-profit, For-profit, Government). This information is provided on the Tech Awards application forms and from Guidestar, Hoovers and ReferenceUSA.

Table 5.2: Template to categorize Bricolage and Resource-seeking activity

Bricolage Template
This template is used to check for evidence of "bricolage" when assembling resources for the social venture. Bricolage is defined as: "Making do with current resources, and creating new products or services from tools and materials at hand." Please list evidence of bricolage (if any) along each of the following 3 resource dimensions: Materials, Labor and Skills. **Materials:** Forgotten, discarded, worn, or presumed "single-application" materials with new use. **Labor:** Involving customers, suppliers and hangers-on in providing free work on projects. **Skills:** Permitting and encouraging the use of self-taught skills on-the-job. For each activity, please include a description, or copy the text that illustrates why the resource activity qualifies as bricolage. (cite source: awards form, venture website, other).

Resource-seeking Template
This template is used to check for evidence of "resource-seeking" when assembling resources for the social venture. Resource-seeking is defined as: "Procuring standard external resources and assembling them to create a new product." Please list resource-seeking activities (if any) along each of the following 3 resource dimensions: Materials, Labor and Skills. **Material:** Buys standard components for the project. The components fit together readily. **Labor:** Employs workers with skills suited to the project. Uses paid employees, contractors or specialists to complete parts of the project. **Skills:** Formal education and prior professional experience are employed to develop the project. For each activity, please include a description, or copy the text that illustrates why the resource activity qualifies as resource-seeking. (cite source: awards form, venture website, other).

5.5 Model Specification and Estimation

I use two regression models to test my hypotheses advanced in Chapter 4. The first model is the Resource Mobilization model, and the second model is the Market Scalability model. The resource mobilization model will test for the effect of the seed funding source and the institutional environment (regulatory, technology, political stability, human development) on the venture's use of bricolage or resource-seeking to mobilize resources. The Market Scalability model tests for the relationship between bricolage, collective agency and market scalability.

Resource-Mobilization Model:

I test three dependent variables -- bricolage, resource-seeking, and resource-mobilization$_{composite}$. The linear form of the regression equations are:

$$Bricolage = \beta_0 + \beta_1 \, Seed\ Funding\ Source + \beta_2 \, Institutional\ Support + \beta_3 \, Venture\ Age + \beta_4 \, Parent\ age + \beta_5 \, Venture\ Type + \beta_6 \, Sector$$

$$Resource\text{-}seeking = \beta_0 + \beta_1 \, Seed\ Funding\ Source + \beta_2 \, Institutional\ Support + \beta_3 \, Venture\ Age + \beta_4 \, Parent\ age + \beta_5 \, Venture\ Type + \beta_6 \, Sector$$

$$Resource\text{-}Mobilization_{composite} = \beta_0 + \beta_1 \, Seed\ Funding\ Source + \beta_2 \, Institutional\ Support + \beta_3 \, Venture\ Age + \beta_4 \, Parent\ age + \beta_5 \, Venture\ Type + \beta_6 \, Sector$$

Market Scalability Model:

I test market scalability as my dependent variable, with bricolage and collective agency as independent variables. The linear form of the regression equation is:

$$Market\ Scalability = \beta_0 + \beta_1\ Bricolage + \beta_2\ Collective\ Agency + \beta_3\ Collective\ Agency\ x\ Bricolage + \beta_4\ Seed\ Funding\ Source + \beta_5\ Institutional\ Support + \beta_6\ Venture\ Age + \beta_7\ Parent\ age + \beta_8\ Venture\ Type + \beta_9\ Sector$$

The dependent variables bricolage, resource-seeking, and market scalability are count variables that take on non-negative integer values. Having a count variable as the DV may violate assumptions of homoskedasticity and normal distribution of errors (Hausman, Hall & Griliches, 1984). Hence using Ordinary Least Squares (OLS) regression can lead to biases in the estimated parameters. To avoid this, I use the Generalized Least Squares regression approach and estimate robust standard errors using a Huber-White sandwich estimator. Such robust standard errors can deal with a collection of minor concerns about failure to meet assumptions, such as minor problems about normality, heteroscedasticity, or some observations that exhibit large residuals, leverage or influence. The point estimates of the coefficients are exactly the same as in ordinary OLS, but the standard errors take into account issues concerning heterogeneity and lack of normality.

Chapter 6: Results

6.1 Introduction

In this chapter I describe the results of the empirical study designed to test the Resource Mobilization model and the Market Scalability model discussed in Chapter 5. Using the resource mobilization model, I tested the effects of seed funding and institutional support on bricolage and resource-seeking. In the growth model I tested for the effects of bricolage and collective agency on market scalability. In the sections that follow, I will first describe the sample and the descriptive statistics, then report the regression results for each model. Finally, I discuss and summarize key findings.

6.2 Descriptive Statistics

The descriptive statistics for the dependent, independent and control variables for the Bricolage model and for the Market Scalability Model are presented in Table 6.1. The final sample consists of data on 202 ventures. The age of these ventures varies from 1 year to 38 years, with the mean age of 7.2 years. The sample includes 63 for-profit ventures, 131 not-for-profit ventures, and 8 government ventures. The sample represents ventures in five different sectors: Health, Economic Development, Equality, Education, and Environment. The sample also represents ventures from 48 different countries. 37% (75) of the ventures in this sample originated in the US. I included a dummy variable US, to account for this difference in venture origin.

As predicted in the Resource Mobilization model *seed funding* and *institutional support* are negatively correlated to *bricolage*, and positively correlated to *resource-seeking* (Table 6.1). Consistent with the Market Scalability model, the correlation between *bricolage* and *market-scalability* is weakly negative, while collective agency is positively correlated with *market-scalability*.

The distributions of the individual variables are described below.

Bricolage: When we consider the distribution of bricolage activity, 62 (30%) ventures did not engage in bricolage at all, while 140 (70%) ventures engaged in some level of bricolage activity. Of these, 34 ventures engaged in bricolage to mobilize resources along all three resource dimensions – materials, labor and skills. 49 ventures engaged in bricolage along two resource dimensions, while 57 ventures engaged in bricolage along only one resource dimension.

Resource-seeking: The distribution of resource-seeking activity indicates that 12 ventures (6%) did not engage in resource-seeking at all, while 190 (94%) ventures engaged in resource-seeking along at least one of the three resource dimensions – materials, labor, and skills. Of these, 109 ventures engaged in resource-seeking along all three resource dimensions. 54 ventures engaged in resource-seeking along two resource dimensions, while 27 ventures engaged in resource-seeking along only one resource dimension.

Resource-Mobilizing$_{composite}$: is a measure of the relative use of bricolage when compared to resource-seeking. 62 ventures registered a score of 0, indicating that they engaged exclusively in resource-seeking, while 12 ventures registered a score

of 6 indicating that they engaged exclusively in bricolage. The remaining 128 (63%) ventures engaged in some combination of bricolage and resource-seeking activities.

Seed Funding: 88 (41%) ventures used founder-financing or no money as their primary source of seed funding. 44 (20%) ventures obtained funding from a parent organization. 16 (7%) ventures received from external investors, while 69 (32%) ventures used external grant financing as their primary source of seed funding.

Institutional Support: The institutional support construct is measured as the sum of four variables: regulatory support, political constraint, technology support and human development. A factor analysis test confirmed that all four variables load on a single factor (eigenvalue = 2.98). Descriptive statistics and correlations between the four dimensions of institutional support are provided in Table 6.2.

Collective Agency: The mean collective agency was 2.65 which indicates that on average, at least three different categories of external actors strongly supported the venture with contributions of expertise and advocacy efforts.

Market Scalability: The frequency distribution of the market-scalability variable indicates that 101(50%) ventures did not scale into new markets. 21 ventures replicated into one additional market. 51 of the remaining ventures entered 2-7 additional markets, while 29 ventures scaled into more than 8 markets.

Table 6.1: Correlations and Descriptive Statistics

	Variable	Mean	s.d.	Min	Max	1	2	3	4	5	6	7	8	9	10	11
1	Project Age	7.17	4.84	1	38											
2	Organization Age	25.46	43.61	2	456	.04										
3	Organization Type	1.73	0.53	1	3	.00	.23***									
4	Sector	3.14	1.47	1	5	.12**	.12**	.18***								
5	US ventures	0.37	0.48	0	1	.02	.03	-.24***	-.01							
6	Seed funding source	2.34	1.31	1	4	-.04	.13**	.24***	.08	-.04						
7	Institutional Support	6.60	2.09	3.26	8.97	.00	.03	-.21	.06	.87***	-.08					
8	Bricolage	1.27	1.07	0	3	-.01	-.19***	.02	.10*	-.11*	-.33***	-.13**				
9	Resource seeking	2.29	0.91	0	3	-.01	.19***	-.10*	-.05	.12**	.28***	.17**	-.77***			
10	Resource-mobilizing$_{composite}$	1.99	1.87	0	6	-.00	-.20***	.06	.08	-.12**	-.33***	-.15**	.95***	-.93***		
11	Collective agency	2.73	1.32	0	7	.14**	.00	.23***	.04	.02	.01	-.00	.14**	-.12**	.14**	
12	Market scalability	6.31	14.93	1	104	.13**	-.00	.12*	.07	.14**	-.03	.13**	-.02	.02	-.02	.42***

N = 202

* p<0.1; ** p<0.05; *** p<0.01

Two-tailed *t*-tests

Table 6.2: Correlations and Descriptive Statistics for institutional support variables

	Variable	Mean	s.d..	Min	Max	1	2	3	4	5	6	7	8	9
1	Institutional Support$_{OL}$	6.60	2.09	3.26	8.97									
2	Regulatory Support$_{OL}$	0.70	0.30	0.03	0.99	.91***								
3	Political Constraint$_{OL}$	0.67	0.24	0	0.87	.76***	.63***							
4	Technology Support$_{OL}$	4.45	1.48	2.22	6.19	.99***	.88***	.71***						
5	Human Development$_{OL}$	0.78	0.19	0.34	0.96	.90***	.83***	.60***	.88***					
6	Institutional Support$_{FL}$	7.14	1.97	3.26	8.97	.73***	.66***	.54***	.72***	.68***				
7	Regulatory Support$_{FL}$	0.78	0.28	0.03	0.99	.67***	.74***	.44***	.64***	.62***	.91***			
8	Political Constraint$_{FL}$	0.73	0.21	0	0.88	.60***	.46***	.73***	.57***	.53***	.79***	.64***		
9	Technology Support$_{FL}$	4.82	1.40	2.22	6.19	.72***	.63***	.51***	.72***	.66***	.99***	.87***	.75***	
10	Human Development$_{FL}$	0.82	0.18	0.34	0.96	.65***	.59***	.46***	.63***	.75***	.90***	.85***	.68***	.87***

N = 202

* p<0.1; ** p<0.05; *** p<0.01

Two-tailed *t*-tests

OL = Operating location – The country in which the venture conducts it's social mission.

FL = Founding location – The country in which the venture is founded (initially incorporated).

6.3 Regression Results

In this section, I first discuss the regression results for the Resource Mobilization model and then discuss results for the Market Scalability model.

6.3.1 Regression Results for the Resource Mobilization model

Tables 6.3, 6.4, and 6.5 provide the results for the regression analyses for the Resource Mobilization model. Table 6.3 presents the results using bricolage as the dependent variable. Table 6.4 presents the regression results with resource-seeking as the dependent variable, and Table 6.5 presents the regression results with resource-mobilization$_{composite}$ as the dependent variable. I estimated all models using Stata 9.2, and report robust standard errors based on generalized least squares (GLS) regression models.

I first discuss the results based on the bricolage approach (Table 6.3) and then discuss the results for the resource-seeking approach (Table 6.4) and the resource-mobilization$_{composite}$ approach (Table 6.5). In each table, Model 1 is the unrestricted baseline model with only the control variables. Models 2 and 3 introduce seed funding and level of institutional support as the independent variables to test hypotheses 1 and 2 respectively. The control variables are tested

using two-tailed tests and independent variables are tested using one-tailed tests of significance.

Bricolage approach: Hypothesis 1a posited a negative relationship between the external seed financing and the use of bricolage. I find that the use of bricolage is negatively related to the source of seed funding (β = -0.269, p<0.01, Table 6.3 Model 2). This result indicates that when seed funding is provided by a source internal to the venture (the founder or the parent organization), the venture makes do with used or previously existing resources at hand. In contrast, when seed funding is provided by a source external to the venture (an external investor or a grant-making organization) the venture does not use bricolage. The results support Hypothesis 1a.

Hypothesis 2a posited a negative relationship between the level of institutional support and the use of bricolage. I find that the use of bricolage is negatively related to the level of institutional support (β = -0.248, p<0.05, Table 6.3 Model 3). The result indicates that when the level of institutional support is low, the venture is more likely to make do with used or previously existing resources at hand. In contrast, when the level of institutional support is high, the venture is less likely to use bricolage.

Hypotheses 3a – 6a posited relationships between the four dimensions of institutional support and bricolage. The results are presented below.

Hypothesis 3a posited a negative relationship between the level of local political support and the use of bricolage. The relationship between bricolage and

local political support is negatively but not significant (β = -0.08, p = 0.202, Table 6.3 Model 4). The result does not support Hypothesis 3a.

Hypothesis 4a posited a negative relationship between the level of technology regulation and the use of bricolage. I find that the use of bricolage is negatively related to supportive technology regulation (β = -0.283, p<0.05, Table 6.3 Model 5). This result indicates that ventures are more likely to use bricolage in regions that have low levels of technological development and regulatory support. The results support Hypothesis 4a.

Hypothesis 5a posited a negative relationship between the regulatory factors that increased the ease of doing business and the use of bricolage. I find that the use of bricolage is negatively related to the level of business regulation (β = -0.201, p<0.05, Table 6.3 Model 6). This result indicates that ventures are more likely to use bricolage when the transaction costs of doing business through formal channels is high. The results support Hypothesis 5a.

Hypothesis 6a posited an inverted-U curvilinear relationship between the level of human development and the use of bricolage. I find that the use of bricolage is curvilinearly related to the level of human development (β_{HDI} = -2.2, β_{HDI}^2 = 2.23, p<0.01, Table 6.3 Model 8). However, the curvilinear relationship is U-shaped. This result indicates that while ventures are more likely to use bricolage in regions that have low levels of human development, they are also likely to use bricolage in regions with very high levels of human development. The results do not support Hypothesis 6a.

Resource-seeking approach: The hypotheses specifying the relationship between the resource-seeking dependent variable and the antecedent seed-funding and institutional support independent variables were posited to have the opposite sign as when bricolage was specified as the dependent variable. The results described below bear support for this specification. The description follows a pattern similar to the description of the bricolage approach.

Hypothesis 1b posited a positive relationship between the source of seed funding and the use of resource-seeking. I find that the use of resource-seeking is positively related to the source of seed funding (β = 0.205, p<0.01, Table 6.4 Model 2). This result indicates that when seed funding is provided by a source external to the venture (an external investor or a grant-making organization) the venture acquires standard external resources to develop the venture. In contrast, when seed funding is provided by a source internal to the venture (the founder or the parent organization), the venture is less likely to engage in resource-seeking. The results support Hypothesis 1b.

Hypothesis 2b posited a positive relationship between the level of institutional support and the use of resource-seeking. I find that the use of resource-seeking is positively related to the level of institutional support (β = 0.326, p<0.01, Table 6.4 Model 3). The result indicates that when the level of institutional support is high, the venture is more likely to seek standard external resources. In contrast,

when the level of institutional support is low, the venture is less likely to use resource-seeking.

Hypotheses 3b – 6b posited relationships between the four dimensions of institutional support and resource-seeking. The results are presented below.

Hypothesis 3b posited a positive relationship between the level of local political support and the use of resource-seeking. The relationship between resource-seeking and local political support is positive but not significant (β = -0.095, p = 0.121, Table 6.4 Model 4). The result does not support Hypothesis 3b.

Hypothesis 4b posited a positive relationship between the level of technology regulation and the use of resource-seeking. I find that the use of resource-seeking is positively related to supportive technology regulation (β = 0.361, p<0.05, Table 6.4 Model 5). This result indicates that ventures are more likely to use resource-seeking in regions that have high levels of technological development and regulatory support. The results support Hypothesis 4b.

Hypothesis 5b posited a positive relationship between the regulatory factors that increased the ease of doing business and the use of resource-seeking. I find that the use of resource-seeking is positively related to the level of business regulation (β = 0.288, p<0.01, Table 6.4 Model 6). This result indicates that ventures are more likely to use resource-seeking when the transaction costs of doing business through formal channels is low. The results support Hypothesis 5b.

Hypothesis 6b posited a U-shaped, curvilinear relationship between the level of human development and the use of resource-seeking. I find that the use of

resource-seeking is positively related to the level of human development (β_{HDI} = 0.168, p<0.05 Table 6.4 Model 7) but the curvilinear relationship is not significant (β_{HDI}^2 = -0.855, p = 0.134, Table 6.4 Model 8). This result indicates that ventures are more likely to use resource-seeking in regions that have high levels of human development, and less likely to use resource-seeking in regions that have low levels of human development. The result does not support Hypothesis 6b.

Resource-mobilization$_{composite}$: In Table 6.5, I test the Resource Mobilization model using resource-mobilization$_{composite}$ as my dependent variable. Resource-mobilization$_{composite}$ measures the level of bricolage *relative* to the level of resource-seeking, when both modes are used in combination in a venture. The results for H1-H6 are similar to when the absolute measure of bricolage is used as the dependent variable.

Table 6.3: Resource Mobilization Model with DV = Bricolage

(Generalized Least Squares regression results)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage
Project Age (log)	0.118	0.038	0.021	0.042	0.022	0.004	0.027	0.052
	(0.165)	(0.159)	(0.159)	(0.160)	(0.159)	(0.158)	(0.158)	(0.34)
Organization Age (log)	-0.334	-0.285	-0.283	-0.289	-0.281	-0.289	-0.278	-0.256
	(0.081)***	(0.075)***	(0.075)***	(0.076)***	(0.075)***	(0.073)***	(0.075)***	(3.44)***
Organization type	0.077	0.213	0.212	0.206	0.213	0.213	0.223	0.239
	(0.154)	(0.158)	(0.159)	(0.158)	(0.159)	(0.159)	(0.160)	(1.52)
Sector	0.079	0.089	0.103	0.091	0.103	0.105	0.100	0.108
	(0.051)	(0.049)*	(0.048)**	(0.049)*	(0.048)**	(0.048)**	(0.048)**	(2.25)**
US	-0.167	-0.168	0.283	-0.087	0.370	0.123	0.001	-0.253
	(0.153)	(0.147)	(0.260)	(0.177)	(0.293)	(0.195)	(0.188)	(1.31)
Seed Funding source		-0.269	-0.279	-0.273	-0.277	-0.279	-0.275	-0.272
		(0.054)***	(0.055)***	(0.054)***	(0.055)***	(0.055)***	(0.054)***	(5.06)***
Institutional Support			-0.248					
			(0.120)**					
Political Constraint				-0.080				
				(0.095)				
Technology Support					-0.283			
					(0.136)**			
Regulatory Support						-0.201		
						(0.096)**		
Human Development							-0.119	-2.129
							(0.090)*	(3.04)***
Human Development^2								2.077
								(2.90)***
Constant	1.633	2.020	1.869	2.021	1.826	1.984	1.934	1.851
	(0.437)***	(0.427)***	(0.435)***	(0.431)***	(0.438)***	(0.420)***	(0.433)***	(4.21)***
Observations	202	202	202	202	202	202	202	202
R-squared	0.10	0.20	0.21	0.20	0.21	0.21	0.20	0.23

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

Table 6.4: Resource Mobilization Model with DV = Resource-seeking
(Generalized Least Squares regression results)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Resource-Seeking	Resource-Seeking	Resource-Seeking	Resource-Seeking	Resource-Seeking	Resource-Seeking	Resource-Seeking	Resource-Seeking
Project Age (log)	-0.130	-0.069	-0.047	-0.073	-0.048	-0.020	-0.053	-0.064
	(0.127)	(0.119)	(0.118)	(0.120)	(0.118)	(0.115)	(0.117)	(0.54)
Organization Age (log)	0.304	0.266	0.264	0.271	0.261	0.271	0.256	0.248
	(0.061)***	(0.058)***	(0.058)***	(0.058)***	(0.058)***	(0.056)***	(0.058)***	(4.23)***
Organization type	-0.233	-0.336	-0.336	-0.328	-0.337	-0.336	-0.351	-0.358
	(0.120)*	(0.122)***	(0.123)***	(0.123)***	(0.124)***	(0.121)***	(0.123)***	(2.91)***
Sector	-0.027	-0.034	-0.052	-0.036	-0.051	-0.056	-0.049	-0.052
	(0.044)	(0.043)	(0.041)	(0.042)	(0.041)	(0.042)	(0.041)	(1.25)
US	0.112	0.113	-0.480	0.016	-0.573	-0.303	-0.125	-0.021
	(0.128)	(0.122)	(0.220)**	(0.150)	(0.256)**	(0.159)*	(0.160)	(0.12)
Seed Funding source		0.205	0.217	0.209	0.215	0.219	0.213	0.212
		(0.048)***	(0.047)***	(0.047)***	(0.047)***	(0.047)***	(0.047)***	(4.49)***
Institutional Support			0.326					
			(0.108)***					
Political Constraint				0.095				
				(0.081)				
Technology Support					0.361			
					(0.126)***			
Regulatory Support						0.288		
						(0.085)***		
Human Development							0.168	0.995
							(0.082)***	(1.32)*
Human Development^2								-0.855
								(1.11)
Constant	2.158	1.863	2.062	1.862	2.111	1.914	1.985	2.019
	(0.364)***	(0.351)***	(0.356)***	(0.355)***	(0.360)***	(0.339)***	(0.354)***	(5.58)***
Observations	202	202	202	202	202	202	202	202
R-squared	0.11	0.18	0.21	0.19	0.21	0.23	0.20	0.21

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

Table 6.5: Resource Mobilization Model with DV = Resource-mobilizing$_{composite}$ ($RM_{composite}$)
(Generalized Least Squares regression results)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	$RM_{composite}$	$RM_{composite}$	$RM_{composite}$	$RM_{composite}$	$RM_{composite}$	$RM_{composite}$	$RM_{composite}$	$RM_{composite}$
Project Age (log)	0.248	0.106	0.068	0.115	0.070	0.025	0.080	0.116
	(0.277)	(0.262)	(0.261)	(0.265)	(0.261)	(0.258)	(0.259)	(0.45)
Organization Age (log)	-0.638	-0.551	-0.547	-0.560	-0.542	-0.560	-0.535	-0.504
	(0.132)***	(0.121)***	(0.120)***	(0.122)***	(0.121)***	(0.117)***	(0.121)***	(4.18)***
Organization type	0.310	0.549	0.548	0.534	0.549	0.549	0.574	0.597
	(0.259)	(0.265)**	(0.266)**	(0.265)**	(0.267)**	(0.264)**	(0.268)**	(2.25)**
Sector	0.106	0.124	0.155	0.127	0.154	0.161	0.148	0.160
	(0.090)	(0.087)	(0.083)*	(0.085)	(0.084)*	(0.085)*	(0.084)*	(1.89)*
US	-0.278	-0.282	0.764	-0.103	0.943	0.426	0.126	-0.232
	(0.263)	(0.250)	(0.421)*	(0.299)	(0.476)**	(0.318)	(0.315)	(0.71)
Seed Funding source		-0.473	-0.496	-0.482	-0.492	-0.498	-0.488	-0.484
		(0.095)***	(0.094)***	(0.095)***	(0.095)***	(0.095)***	(0.095)***	(5.16)***
Institutional Support			-0.574					
			(0.201)***					
Political Constraint				-0.175				
				(0.165)				
Technology Support					-0.645			
					(0.228)***			
Regulatory Support						-0.490		
						(0.163)***		
Human Development							-0.287	-3.124
							(0.155)**	(2.34)**
Human Development^2								2.932
								(2.17)**
Constant	2.474	3.157	2.806	3.159	2.716	3.070	2.949	2.832
	(0.749)***	(0.723)***	(0.732)***	(0.732)***	(0.739)***	(0.702)***	(0.729)***	(3.80)***
Observations	202	202	202	202	202	202	202	202
R-squared	0.11	0.21	0.23	0.22	0.23	0.24	0.22	0.24

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

6.3.2 Regression Results for the Market Scalability model.

In tables 6.6 and Table 6.7, I provide the results of the regression analyses for the Market Scalability model. Table 6.6 presents the results using the 'market scalability' variable as the dependent variable and bricolage and collective agency as the independent variables. Table 6.7 presents the results with the resource-mobilization$_{composite}$ variable as the independent variable. I estimated all models using Stata 9.2. For all models I report robust standard errors using GLS regression models.

Hypothesis 7 posited a negative relationship between the use of bricolage to found a venture and the subsequent scalability of the venture into new markets. I find that the use of bricolage is negatively related to venture scalability (β = -0.117, $p<0.05$, Table 6.6 Model 4). This result provides support for Hypothesis 7, which suggests that the venture's use of bricolage can result in idiosyncratic localized capabilities that are difficult to replicate into new markets.

Hypothesis 8 posited a positive relationship between the level of collective agency – the participation of external actors in venture development, and the subsequent scalability of the venture into new markets. I find that the presence of collective agency is positively related to venture scalability (β = 0.318, $p<0.01$, Table 6.6 Model 3). This result provides support for Hypothesis 8, which suggests that participation of external actors in venture development can help it replicate into new markets.

Hypothesis 9 posited that the level of collective agency would weaken the negative relationship between bricolage and the subsequent scalability of the venture into new markets. I find that the presence of the interaction term between collective agency and bricolage weakens the initial negative relationship between bricolage and venture scalability (β = 0.006, p=0.884, Table 6.6 Model 5), but the result is not significant. This result does not provide support for Hypothesis 9.

In table 6.7, I test the Market Scalability model using resource-mobilization$_{composite}$ and collective agency as my dependent variables. Resource-mobilization$_{composite}$ measures the level of bricolage *relative* to the level of resource-seeking, when both modes are used in combination in a venture. The results bear support for the market-scalability hypotheses when we include this relative measure of bricolage.

Table 6.6: Market Scalability Model – with DV = Market scalability, IV = Bricolage
(Generalized Least Squares regression results)

	Model 1	Model 2	Model 3	Model 4	Model 5
	Market Scalability (log)	Market Scalability (log)	Market Scalability (log)	Market Scalability (log)	Market Scalability (log)
Project Age (log)	0.421	0.405	0.240	0.236	0.235
	(0.131)***	(0.132)***	(0.122)*	(0.117)**	(0.117)**
Organization Age (log)	-0.010	0.001	-0.000	-0.033	-0.034
	(0.073)	(0.073)	(0.067)	(0.066)	(0.066)
Organization type	0.107	0.136	-0.067	-0.051	-0.052
	(0.151)	(0.153)	(0.135)	(0.134)	(0.134)
Sector	0.005	0.006	0.013	0.025	0.026
	(0.043)	(0.043)	(0.038)	(0.038)	(0.038)
US	0.273	0.249	0.140	0.168	0.167
	(0.143)*	(0.230)	(0.194)	(0.191)	(0.191)
Seed Funding source		-0.057	-0.046	-0.078	-0.077
		(0.048)	(0.044)	(0.043)*	(0.042)*
Institutional Support		0.013	0.039	0.011	0.010
		(0.102)	(0.089)	(0.087)	(0.088)
Collective agency			0.318	0.332	0.324
			(0.056)***	(0.055)***	(0.082)***
Bricolage				-0.117	-0.134
				(0.053)**	(0.115)
Bricolage x Collective agency					0.006
					(0.043)
Constant	0.237	0.327	0.130	0.340	0.358
	(0.365)	(0.362)	(0.346)	(0.338)	(0.356)
Observations	202	202	202	202	202
R-squared	0.07	0.08	0.27	0.29	0.29

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

Table 6.7: Market Scalability Model with DV = Market scalability, IV = Resource-mobilizing $_{composite}$ ($RM_{composite}$)
(Generalized Least Squares regression results)

	Model 1	Model 2	Model 3	Model 4	Model 5
	Market Scalability (log)	Market Scalability (log)	Market Scalability (log)	Market Scalability (log)	Market Scalability (log)
Project Age (log)	0.421	0.405	0.240	0.238	0.238
	(0.131)***	(0.132)***	(0.122)*	(0.118)**	(0.118)**
Organization Age (log)	-0.010	0.001	-0.000	-0.038	-0.038
	(0.073)	(0.073)	(0.067)	(0.068)	(0.068)
Organization type	0.107	0.136	-0.067	-0.037	-0.037
	(0.151)	(0.153)	(0.135)	(0.136)	(0.137)
Sector	0.005	0.006	0.013	0.024	0.024
	(0.043)	(0.043)	(0.038)	(0.038)	(0.038)
US	0.273	0.249	0.140	0.188	0.188
	(0.143)*	(0.230)	(0.194)	(0.192)	(0.192)
Seed Funding source		-0.057	-0.046	-0.080	-0.080
		(0.048)	(0.044)	(0.044)*	(0.043)*
Institutional Support		0.013	0.039	0.000	0.000
		(0.102)	(0.089)	(0.089)	(0.089)
Collective agency			0.318	0.331	0.334
			(0.056)***	(0.056)***	(0.082)***
$RM_{composite}$				-0.069	-0.065
				(0.032)**	(0.069)
$RM_{composite}$ x Collective agency					-0.002
					(0.026)
Constant	0.237	0.327	0.130	0.315	0.308
	(0.365)	(0.362)	(0.346)	(0.336)	(0.352)
Observations	202	202	202	202	202
R-squared	0.07	0.08	0.27	0.29	0.29

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

6.4 Discussion of Results

This finds support for several hypotheses (summarized in Table 6.10). I first discuss the results for the Resource Mobilization model and then discuss the results for the Market Scalability model.

Resource Mobilization Model: I find that the source of seed funding is negatively related to the use of bricolage during venture founding. Ventures that obtain external funding from investors or from grant-making foundations are less likely to engage in bricolage and more likely to acquire standard materials and hire professionally certified employees. In contrast, ventures that utilized internal funding from founders or parent organizations, or who did not receive funds at all, were more likely to engage in bricolage. This finding is consistent with earlier literature that suggests that bricolage occurs in capital-constrained environments (Baker & Nelson, 2005).

Table 6.8 provides a finer-grained analysis of the relationship between different types of funding and the use of bricolage. The regression results indicate that self-funded ventures are most likely to engage in bricolage in comparison to ventures with any other source of funding (Table 6.8, Model 4, β = -0.953, $p < 0.01$). The results also indicate that ventures that receive donor grants are more likely to engage in bricolage than ventures that receive external investments (Table 6.8, Model 8, $\beta = 0.665$, $p < 0.05$). Overall level of institutional support is also negatively related to the level of bricolage. This suggests that bricolage often occurs in conditions which lack supportive regulatory structures for starting a new

venture. In this section I explore the types of institutional environments that facilitate the use of bricolage.

Ease of doing business. The results showed that the regulatory ease of doing business is negatively related to the use of bricolage. In locations that facilitate starting a business, getting credit, dealing with licenses, employing workers and registering property, a venture is more likely to go down the path of resource-seeking. Alternatively, ventures that operate in those locations which score low on the ease-of-doing-business index are more likely to make do with existing resources at hand, and involve informal sources of labor and skills.

Political Support. The relationship between political stability at the venture's operating location and bricolage was not significant. However, in some cases the venture was founded in one country, but conducted its social mission in a different country. I found that the relationship between political stability at the venture's founding location was negatively related to bricolage (β = -0.255, $p<0.05$). This finding suggests that while the choice of bricolage or resource-seeking was not directly related to the level of political stability in the operating country, the level of political stability in the venture's founding country might dictate which initial resource mobilization path the venture would choose. Once the venture reached the operating country, considerations of local political stability could be too far removed from the day-to-day operation, and the regulatory 'ease of doing business' would have a greater effect on the venture's choice of either bricolage or resource-seeking.

Technology regulation. The relationship between institutional support for technology and the venture's use of bricolage was both negative and significant. This finding bears discussion in the context of the global competitiveness technology index (Porter et al., 2005) which I used to measure technological achievement. This index is weighted to indicate how technology plays different roles, depending upon a country's particular stage of development. Thus, technological innovation is given more weight in countries close to the technological frontier (e.g., Sweden) while in developing countries (e.g., Czech Republic), the adoption of foreign technologies and the kind of technology transfer frequently associated with foreign direct investment are given more weight. My results thus suggest that technology ventures that match the technological strengths of their operating location are more likely to acquire standard materials and hire professionally certified employees. Ventures that do not match the technological strengths of their operating location are less likely to find appropriately skilled employees and more likely to hire people who will learn on the job. The important point is that technology ventures *will* develop, regardless of institutional environment. However, ventures will use different modes of resource-mobilizing, depending upon the institutional environment.

Human Development. The country-level of human development has a U-shaped curvilinear and significant relationship to the venture's use of bricolage (see Table 6.4 model 8). The inflection point on the HDI index appears at a level of 0.8 (see Figure 6.1). This finding is surprising and contrary to the hypothesis which

states that the relationship between human development and bricolage would be *inverted* U curvilinear.

I theorized when using the resource-dependence perspective that ventures would depend on the environment for their resources. While bricolage can occur in resource-constrained environments, a certain minimum level of preexisting resources that are needed to sustain bricolage. In penurious environments which did not even have this minimum amount of resources, the only way a venture could sustain itself would be to engage in resource-seeking from other locations. Thus, I hypothesized an inverted-U relationship between human development and bricolage.

One possible explanation for not finding an inverted-U is that the sample does not include ventures in extremely penurious environments. However, the sample did contain 48 ventures from 22 countries where the human development index is less than 0.6, and the mean GDP/capita is very low, at $1373. These 48 ventures existed in extremely penurious environments. The data indicate that all of these ventures used bricolage to mobilize resources.

The results of the regression rather suggest an alternative perspective regarding the use of bricolage to mobilize resources. While bricolage is used in penurious environments (HDI <0.6), it is also prevalent in prosperous environments (HDI >0.8), i.e., countries on the technological frontier. The difference is that while penurious environments prompt the use of bricolage along the material, labor and skill dimensions ($mean_{MLS}$ = 0.6, 0.6, 0.4 across 48 ventures with HDI <0.6),

prosperous environments prompt the use of bricolage along the labor and skills dimensions ($mean_{MLS}$ = 0.3, 0.5, 0.4 across 107 ventures with HDI >0.8). These environments offer a skilled, educated workforce that develops new ventures using their creative skills and voluntary labor. This finding suggests that bricolage is used not only in subsistence environments but can be an important source of new venture creation and innovation in .prosperous environments as well.

Market Scalability Model: I found that the relationship between collective agency and market scalability was both positive and significant. This is consistent with the prediction that it takes the participatory actions of actors external to the venture to grow a venture into new markets (Garud & Karnoe, 2003). I also found that the relationship between bricolage and market scalability was negative and significant. This finding lends credence to the idea that a venture which focuses exclusively on bricolage can develop resource-mobilizing patterns idiosyncratic to the initial location and difficult to scale (Baker & Nelson, 2005).

The interaction effect between collective agency and bricolage was in the predicted direction, but was not significant. Thus, while the qualitative study indicated that ventures that engaged in bricolage *and* involved external actors in venture development could avoid the idiosyncratic trap and scale to new markets, the empirical study did not find initial support for this conclusion.

As a post-hoc test I conducted a factor analysis of the collective agency variable. Table 6.9 gives the results of the factor analysis, and the collective agency

equation with factor eigenvalues. Regression models for the interaction effect between bricolage and the revised collective agency variable (Collective $\text{Agency}_{\text{Factor}}$) was in the predicted direction and significant (Table 6.10 Model 2, β = -0.098, p = 0.06). The interaction between collective agency and bricolage is illustrated in Figure 6.2. The slope of the relationship between bricolage and market scalability is significantly affected by the introduction of collective agency (Figure 6.2, $\Delta\beta_{LoCA - Hi\ CA}$ significant at $p<0.05$).

The factor loadings (Table 6.9) also indicated that, of the seven components of collective agency, the role of customers, discussion groups, and distributors loaded highest on a single factor. Regression models for the interaction effect between bricolage and the collective agency of these groups (Collective $\text{Agency}_{\text{cus,dist,disc}}$) was also in the predicted direction and was significant (Table 6.10 Model 4, β = -0.126, p = 0.03). The result indicates that collective agency weakens the negative relationship between bricolage and market scalability. This is an important result which explains how small resource-constrained organizations can scale rapidly into new markets, despite a lack of capital and institutional support. Organizations first use bricolage upon founding. While bricolage on its own has a negative effect on scalability, it is positively related to collective agency. In the presence of collective agency, organizations can in fact scale to new markets.

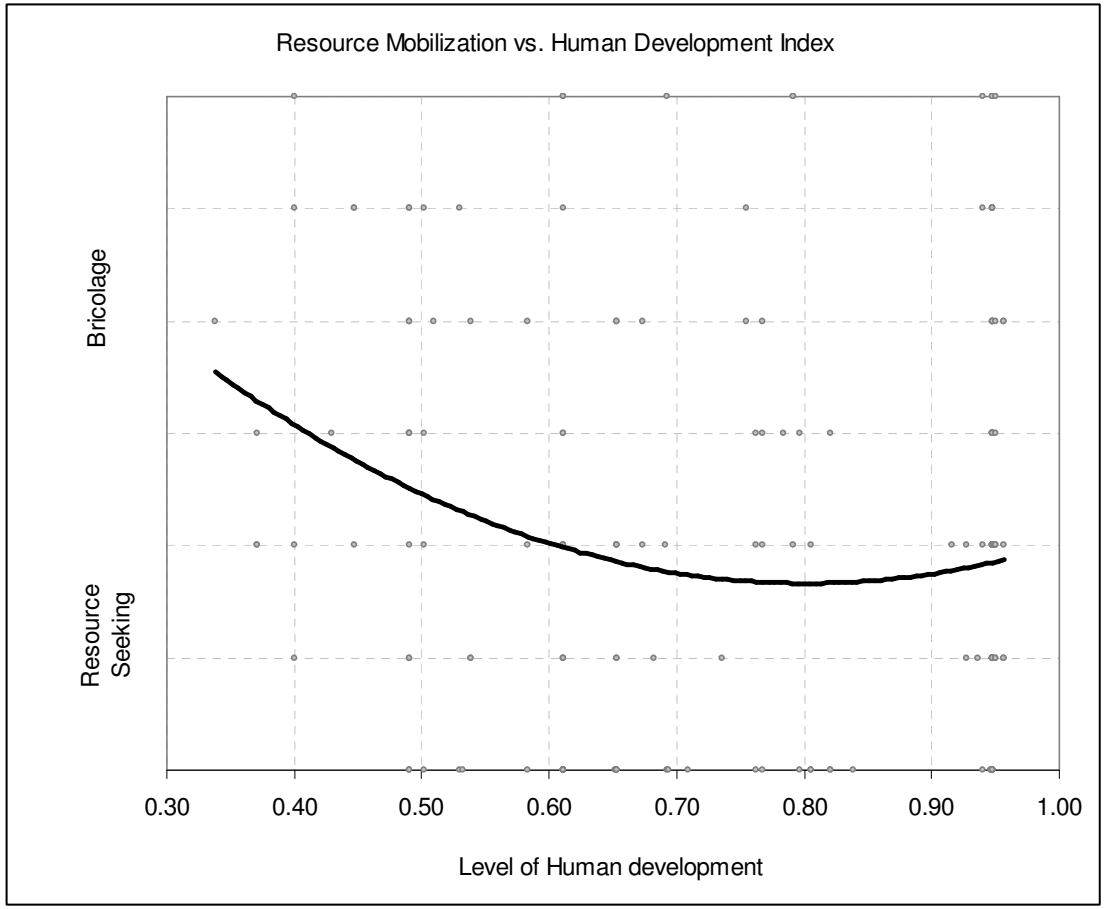

Figure 6.1: Bricolage and Resource seeking with varying levels of Human Development

Table 6.8: Seed Funding Source Regression Analysis, DV = Bricolage

(Generalized Least Squares regression results)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage	Bricolage
Project Age (log)	0.118	0.038	0.080	0.001	-0.067	-0.111	-0.026	0.069
	(0.165)	(0.159)	(0.162)	(0.151)	(0.190)	(0.242)	(0.185)	(0.258)
Organization Age (log)	-0.334***	-0.285***	-0.340***	-0.172**	-0.154	-0.178	-0.154*	-0.162
	(0.081)	(0.075)	(0.076)	(0.076)	(0.123)	(0.136)	(0.086)	(0.102)
Organization type	0.077	0.213	0.160	0.198	0.213	0.296	0.184	-0.084
	(0.154)	(0.158)	(0.155)	(0.153)	(0.209)	(0.257)	(0.214)	(0.230)
Sector	0.079	0.089*	0.099**	0.031	0.037	0.025	-0.030	-0.017
	(0.051)	(0.049)	(0.050)	(0.048)	(0.079)	(0.081)	(0.067)	(0.077)
US	-0.167	-0.168	-0.160	-0.158	-0.289	-0.217	-0.131	0.065
	(0.153)	(0.147)	(0.148)	(0.140)	(0.188)	(0.208)	(0.170)	(0.198)
Seed Funding (1=Self, 2=Parent, 3=Investor, 4= Grant)		-0.269***						
		(0.054)						
SF Internal vs. External (1= Self, Parent, 2 = Inv., Grant)			-0.597***					
			(0.139)					
Seed Funding Self vs. Any other funding source				-0.953***				
				(0.147)				
Seed Funding Self vs. Parent					-1.038***			
					(0.256)			
Seed Funding Self vs. Investor						-0.573***		
						(0.127)		
Seed Funding Self vs. Grant							-0.284***	
							(0.057)	
Seed Funding Investor vs. Grant								0.665**
								(0.285)
Constant	1.633***	2.020***	2.354***	2.881***	3.064***	2.630***	2.445***	-1.097
	(0.437)	(0.427)	(0.455)	(0.448)	(0.557)	(0.694)	(0.507)	(1.030)
Observations	202	202	202	202	120	95	149	82
R-squared	0.10	0.20	0.17	0.26	0.28	0.23	0.20	0.08

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

Table 6.9: A Factor Analysis of the Collective Agency Construct

Factor analysis/correlation			Number of obs = 202	
Method: principal factors			Retained factors = 3	
Rotation: (unrotated)			Number of params = 18	
Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	0.534	0.373	1.777	1.777
Factor2	0.161	0.129	0.536	2.313
Factor3	0.032	0.059	0.106	2.419
Factor4	-0.027	0.035	-0.089	2.330
Factor5	-0.062	0.075	-0.205	2.125
Factor6	-0.136	0.066	-0.453	1.672
Factor7	-0.202	.	-0.672	1.000

LR test: independent vs. saturated: chi2(21) = 32.44 Prob>chi2 = 0.0527
Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Uniqueness
ca_tech	0.099	0.209	-0.063	0.943
ca_sup	0.251	-0.068	0.116	0.919
ca_cus	0.383	-0.093	0.040	0.843
ca_fund	0.122	0.250	0.055	0.920
ca_dist	0.289	-0.164	-0.084	0.883
ca_disc	0.408	0.061	-0.054	0.827
ca_reg	-0.225	-0.106	-0.005	0.938

$$\text{Collective Agency}_{\text{Factor 1}} = 0.1*\text{ca\_tech} + 0.25*\text{ca\_sup} + 0.38*\text{ ca\_cus} + 0.12*\text{ca\_fund} + 0.29*\text{ ca\_dist} + 0.41*\text{ca\_disc} - 0.22*\text{ca\_reg}$$

Table 6.10: Post-Hoc Scalability Model: DV = Market Scalability, IV = Collective AgencyFactor x Bricolage
(Generalized Least Squares regression results)

	1	2	3	4	5	6	7	8
DV = Market Scalability (MS_{log})	MS_{log}	MS_{log}	MS_{log}	MS_{log}	MS_{log}	MS_{log}	MS_{log}	MS_{log}
Project Age (log)	.303***	.318***	.353***	.362***	.385***	.387***	.35***	.41***
	(.111)	(.110)	(.104)	(.102)	(.120)	(.124)	(.114)	(.118)
Organization Age (log)	-.007	-.009	-.029	-.034	-.015	-.019	-.012	-.033
	(.061)	(.061)	(.059)	(.059)	(.065)	(.064)	(.070)	(.064)
Organization type	.021	.039	.074	.101	-.005	-.010	.189	.125
	(.124)	(.123)	(.129)	(.128)	(.134)	(.132)	(.146)	(.151)
Sector	-.016	-.025	-.022	-.030	-.012	-.013	-.028	.026
	(.039)	(.039)	(.039)	(.039)	(.041)	(.041)	(.041)	(.041)
US	.137	.123	.244	.242	.271	.357*	.197	.302
	(.193)	(.192)	(.177)	(.176)	(.213)	(.210)	(.204)	(.204)
Seed Funding source	-.038	-.055	-.016	-.039	-.038	-.065	-.048	-.051
	(.042)	(.041)	(.043)	(.042)	(.046)	(.045)	(.045)	(.047)
Institutional Support	-.008	.015	-.014	.010	-.048	-.067	.010	.008
	(.090)	(.093)	(.082)	(.084)	(.098)	(.096)	(.090)	(.093)
Bricolage	-.120**	-.115**	-.101**	-.094**	-.124**	-.135**	-.052	-.057
	(.052)	(.049)	(.052)	(.049)	(.057)	(.056)	(.053)	(.058)
Collective $Agency_{Factor}$	.453***	.596***						
	(.064)	(.116)						
Bricolage x Collective $Agency_{Factor}$		-.098*						
		(.062)						
Collective Agency (cus, dist,disc)			.455***	.636***				
			(.068)	(.120)				
Bricolage x Collective Agency (cus, dist,disc)				-.126**				
				(.066)				
Discussion Groups					.316***	.620***		
					(.080)	(.175)		
Bricolage x Discussion Groups						-.168**		
						(.075)		
Customers							.32***	
							(.057)	
Distributors								.27***
								(.071)
Constant	.95***	.982***	.721**	.762**	.800**	.918**	.539	.398
	(.300)	(.309)	(.295)	(.306)	(.330)	(.358)	(.346)	(.326)
Observations	202	202	202	202	202	202	202	202
R-squared	.31	.33	.31	.33	.19	.22	.19	.17

* p<0.1; ** p<0.05; *** p<0.01, Robust standard errors in parentheses, Controls tested using two-tailed test, IV tested using one-tailed test

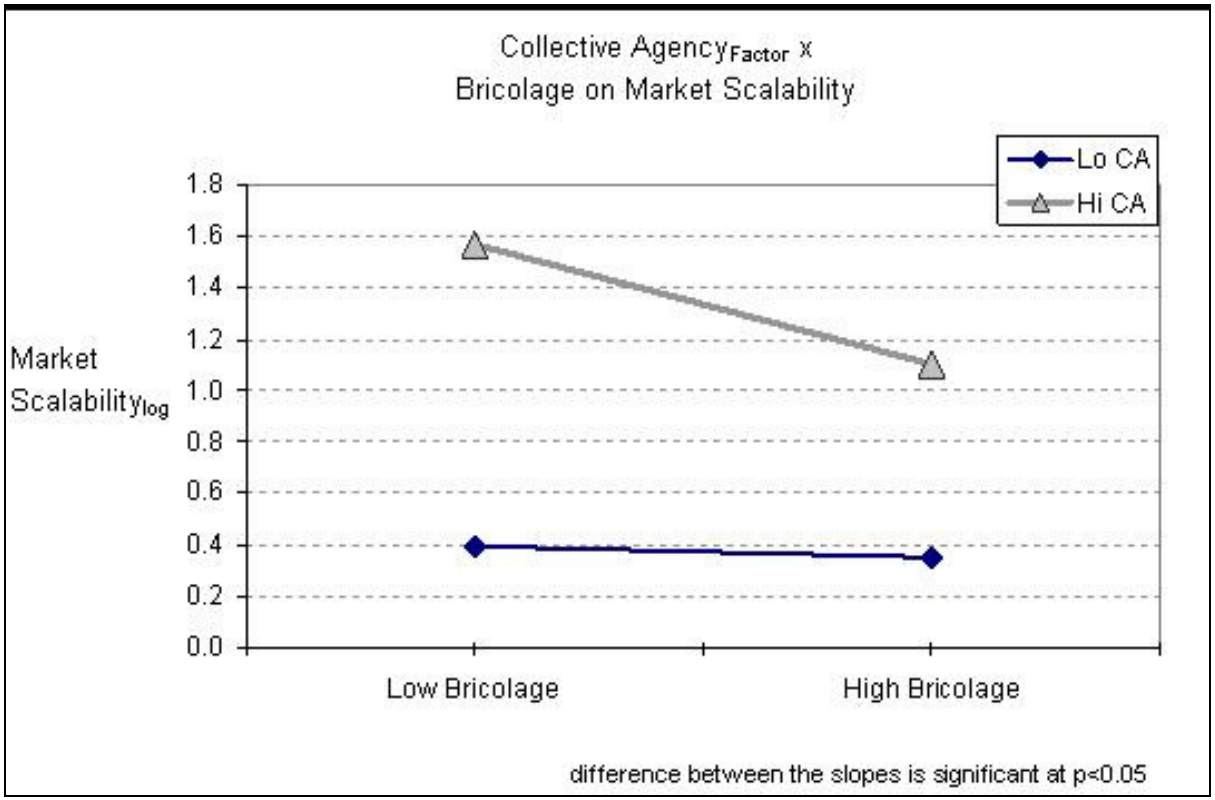

Figure 6.2: Interaction effect of Collective agency on Bricolage

Table 6.11: Summary of Results

	Resource Mobilization Model[1] DV = Bricolage	**Proposed Sign**	**Actual Results**	**Finding**
H1	Seed Funding source	-	-, significant	supported
H2	Institutional Support	-	-, significant	supported
H3	Political stability	-	-, not significant	not supported
H4	Technology support	-	-, significant	supported
H5	Business regulatory support	-	-, significant	supported
H6	Human development	Inverted U	U, significant	not supported
	Market Scalability Model[2] DV = Market Scalability	**Proposed Sign**	**Actual Results**	**Finding**
H7	Bricolage	-	-, significant	supported
H8	Collective Agency	+	+, significant	supported
H9	Bricolage x Collective Agency	weakens H3a	-, significant	supported[3]

[1] Regressions in Table 6.3, [2] Regressions in Table 6.6, [3] After factor analysis of the Collective Agency variable, Table 6.10

6.5 Robustness Checks

I conducted the following robustness checks on the data. For each venture I measure the source of initial funds as being internal or external to the organization. If the founder or parent organization provides funding for the venture, I coded that as '0'. If funds are provided by an external grant provider or investor, the funding source was coded as '1'. The significance of the results does not change.

In 157 cases the founding and operating locations were the same. In the remaining 60 cases, the venture was founded in one country, but conducted its social mission in a different country. I measured institutional support for the founding location and for the operating location of each venture. While the regression results are reported for institutional support in the operating country, I also ran the regression results to take into account the founding location of each venture. The significance of the results does not change, with the exception of the effect of political constraint on resource-mobilization. This exception is discussed in the political constraint section 6.3.

I measured technology support using the technology achievement index (TAI) as an alternative specification. TAI is a composite measure developed by the United Nations to capture the institutional support in creating and diffusing a technology and in building a human skills base (Desai, Fukuda-Parr, Johannsson & Sagasti 2002, Archibugi & Coco 2005). The index ranks countries on a comparative global scale and aims to capture technological achievements of a country in four dimensions: 1) creating new technology; 2) diffusing the adoption

of new technologies; 3) diffusion of long existing technologies that are still basic inputs to the industrial and the network age; 4) building a human skill base for technological creation and adoption. The relationship between TAI and bricolage was negative but not significant. One possible explanation for the non-significant relationship is that the TAI captures telecommunications use, internet use, education and patents granted, but does not accurately capture the level of relevant technological support required by the venture. For instance, ventures in developed countries are more likely to depend upon institutional support for technological innovation, while ventures in developing countries are more likely to depend upon institutional support for the transfer of appropriate technologies from developed countries. This distinction between innovative and appropriate technology provides an interesting path for future research.

I also tested the Resource Mobilization model using resource-mobilization$_{composite}$ as the dependent variable. This variable accounts for a venture's relative use of bricolage vs. resource-seeking (described in section 5.4.1). The statistical significance of the results remains unchanged (Table 6.5).

6.6 Summary

This dissertation addressed two research questions: 1) How do social ventures mobilize resources in penurious environments? 2) How do social ventures scale into new markets? Penurious environments are manifested in the form of lack of external financing or a lack of institutional support. I empirically examined how

202 technology social ventures in 42 countries mobilized resources for venture creation. Of these, 101 ventures subsequently scaled into al least one new market.

In answer to the first question, my dissertation demonstrates that social ventures can originate, develop and grow through two modes of resource-mobilization: bricolage and resource seeking. In particular, my dissertation shows that ventures use bricolage in the absence of external financing. Ventures also use bricolage when faced with low levels of institutional support (e.g. business regulation, technology regulation, and human development).

In answer to the second question, the presence of collective agency, (i.e. the participation of external actors in the development of the venture) is particularly important to the venture scaling into new markets. Further, bricolage without collective agency can have a direct negative effect on market scalability. However, the presence of collective agency can decrease the negative effects of bricolage on market scalability. To summarize, bricolage can help a venture start in penurious environments, but a higher collective level of bricolage is required for the venture to scale into new markets.

Chapter 7: Conclusion

7.1 Introduction

In this chapter I present key contributions and the implications of the work proposed in this dissertation, which was built upon a theoretical foundation from the entrepreneurship and strategic management literature, matched to a qualitative study, and tested on a large sample of international technology ventures. This is the first research study to integrate what we know about entrepreneurial ventures with an in-depth field study and a large sample empirical study in social entrepreneurship.

My dissertation addresses a fundamental research question in entrepreneurship: How do ventures mobilize resources to originate, develop, and grow in a penurious environment? In the first part of my dissertation I examined this question using a comparative field study of eight social ventures in a technology incubator. In the second part I integrated findings from the field study with a theoretical perspective on resource mobilizing in constrained environments. Drawing upon these insights, I empirically examined how 202 technology social ventures in 42 countries mobilized resources for venture creation.

In the following sections I shall discuss the theoretical and empirical contributions to entrepreneurship research. Following, I will consider the implications for practicing entrepreneurs. In the final section, I enumerate the limitations of this study and conclude with directions for future research.

7.2 Theoretical Contributions to Entrepreneurship Research

Resource mobilization is a fundamental concern when starting any venture. Entrepreneurship researchers have devoted significant amounts of time and energy to understanding how new ventures mobilize resources (Hsu, 2008; Shane, 2003). When new ventures face resource constraints, entrepreneurship researchers have made the important assumption that the environment has resources to provide to the venture. In line with this assumption, the literature has focused on conditions that improve the venture's chances of *resource seeking*—that is, acquiring resources from the environment—and the subsequent probability of success (Aldrich, 1999; Shane, 2003,). These conditions can include the nature of the opportunity (Low & Abrahamson, 1997; Shane, 2000), venture legitimacy (Aldrich & Fiol, 1994; Meyer, 1983), founder experience (Amit, Glosten, & Muller, 1993; Boeker, 1989), and technological capability of the new venture (Shane & Stuart, 2002; Westhead & Storey, 1997).

What the literature has failed to consider is ventures that operate in penurious environments and do not have access to resources (see Kodithuwakku & Rosa (2002) and Starr & MacMillan (1990) for exceptions). In such environments any emphasis on conditions that may improve the chances for resource-seeking can be misguided, because the environment does not have the resources to provide to the venture. Even while lacking viable opportunities, legitimacy, or intellectual property, many ventures stubbornly survive in penurious environments and are able to provide valuable products and services. To address this research gap, I explicitly

consider how ventures operate in penurious environments which lack resources. In so doing, I integrate the insights of two different literatures—the resource-based view (Penrose, 1959) and the resource-dependence view of the firm (Pfeffer & Salancik, 1978)—in order to highlight the bricolage construct as an important driver in penurious environments, as opposed to the more amply studied resource-seeking approach.

This dissertation makes key contributions to the entrepreneurship literature. First, it sheds light on an alternative framework of resource-mobilization through bricolage (Baker & Nelson, 2005, Levi-Strauss, 1967) and suggests that firms can make do with the "junk" resources at hand and still survive and sometimes even grow.

Second, it presents a framework that links two critical factors in entrepreneurship research: the mobilization of resources and venture growth in penurious environments. To my knowledge, this work is the first dissertation to theorize and test such a relationship in entrepreneurship. I empirically confirm that penurious environmental conditions (*seed funding sources* and *institutional factors*) influence resource-mobilization (*bricolage* or *resource seeking*). I also confirm that while bricolage has a negative effect on market scalability, the use of collective agency can help the venture to grow. Bricolage can help a venture start up in a penurious environment, but a greater collective level of bricolage is required in order for the venture to scale into new markets.

Third, this dissertation highlights the role of collective agency in venture (and market) development. Similar to Garud and Karnoe's (2003) study of technology entrepreneurship, this dissertation highlights how technology-based social entrepreneurship entails not only the discovery of opportunities by alert individuals (Kirzner, 1997) or speculation of the future, but also the creation of new opportunities by a collective of actors (Garud & Karnoe, 2003) who are external to the focal venture. The dissertation empirically demonstrates that the participation of external actors is of particular importance to the venture scaling into new markets.

Further, the dissertation extends the traditional person-centric entrepreneurship literature to highlight the role of resources, users, partners, and institutions in the founding and growth processes of new ventures. By focusing exclusively on technology ventures engaged in social innovation, this research contributes to our understanding of the ways in which technology may be used to address social problems in an economically sustainable manner.

7.3 Practical Implications for Entrepreneurs

Social entrepreneurs (and a sizable portion of commercial entrepreneurs) often face severe resource constraints. By the same token, social entrepreneurs often approach problems not addressed or recognized by existing public or private institutions, and consequently operate in an institutional void. Commercial entrepreneurs witness this institutional void as the absence of an existing market for their products and services. Under these conditions, entrepreneurs may expend a

great amount of effort seeking resources and convincing investors to provide resources (financial and other) for their ventures. In penurious environments, such efforts often prove futile. Further, the availability of initial funding does not guarantee financial sustainability of the venture. This dissertation suggests that bricolage can be used as a viable alternative route to venture funding.

By involving friends and volunteers, and purposely looking for preexisting materials that can be reused or creatively adapted, bricolage processes allow a venture to originate and build capabilities. However, bricolage can also lead to idiosyncratic routines which are not easily scalable and that may consequently limit venture growth (Baker & Nelson 2005). This can present a serious limitation for ventures that seek to expand their impact by adding customers (for economic growth) or beneficiaries (for social impact). In order to sustain and grow the venture, the role of the collective cannot be underestimated.

The involved participation of external actors—users, regulators, technology providers, suppliers and even discussion groups—can transform the nascent venture to one which reaches higher functionalities and new markets. External supporters endow a venture with legitimacy, credibility, new knowledge, and enthusiasm, which can attract the attention of potential funders and customers. Observations of the technology social ventures studied in this dissertation indicate that entrepreneurs who deploy bricolage processes are able to provide products or services which would be otherwise unavailable to users (due to poverty or lack of access). By rendering unique services in resource-poor environments, and by

finding ways to maintain financial sustainability, entrepreneurs can create markets for services when previously none existed.

7.4 Limitations

Some limitations to the research for this study must be addressed. First, sample selection bias. The technology ventures in my sample chose to participate in the Technology Museum of Innovation awards application process. The call for applications was sent out to 160 United Nations program countries, from which ventures operating in 57 countries answered the call. Descriptive statistics on population, human development and per capita GDP do not show any significant differences among the 57 countries in the sample and the total of 160 countries.

Second, an endogeneity bias may exist, in one or more unobserved factors driving both the use of bricolage (or resource seeking) and the market scalability of the venture. (I ran a 2 stage least squares test for endogeneity using population and GDP as instrumental variables, but the residuals were not significant.)

Third, I was not able to directly observe the presence of bricolage/resource-seeking in the large sample but had to rely on founder descriptions on the application forms and venture websites of the steps taken to acquire resources. I also had to use external actor recommendations, partner listings, and recommender descriptions of the venture to proxy for the collective agency supporting the venture. These descriptions were independently coded by two raters to arrive at estimates (with high convergent validity) of bricolage, resource-seeking, and collective agency. The face validity of the bricolage and collective agency

constructs may be reasonably assured, as it was derived from prior literature (Baker & Nelson, 2005; Garud & Karnoe, 2003) and from direct observations of acts of bricolage and resource-seeking in the eight ventures in my field study.

Fourth, causality in this dissertation was interpreted from the theoretical argument and the longitudinal field study which unfolded and was observed in real time. While care was taken to capture bricolage and resource-seeking at venture founding, the large sample study data was collected cross-sectionally between 2005 and 2007. In order to empirically demonstrate causality, future researchers may wish to consider using panel data.

Fifth, generalizability of this study must be interpreted with caution, as the results are limited to the characteristics of the test sample population. The results are not necessarily generalizable to venture-capital funded ventures, corporate venture capital, or family-owned small businesses. The empirical results may be specifically interpreted for ventures that develop and deploy some specific technology to address a social need. I have tried to preserve the variation in social enterprises in order to extend the generalizability of the framework, by drawing the sample from a global population of technology social ventures. Such technology social ventures offer a large variation in their characteristics, including the variability in form (nonprofit, for-profit), sector (education, health, economic development, environment, equality), founding endowment (parent organization, de novo) and country (including established and emerging markets).

Social entrepreneurship researchers and practitioners identify resource mobilization as a key concern for social ventures. As indicated by the literature review in Chapter 3, a majority of academic studies are case-based and largely descriptive. At this early stage in social entrepreneurship research, scholars have attempted to describe the resource mobilization process in social ventures, but have so far lacked a theoretical framework to which these social ventures may be ascribed. While this empirical study helps refine and validate a theoretical framework for social entrepreneurship, in light of the above limitations, the findings may be considered exploratory at best.

7.5 Future Research

Technology social ventures (TSVs) reside at the intersection of social entrepreneurship and technology entrepreneurship, emerging fields with plenty of challenges and opportunities for research. The challenge for researchers is how to judiciously apply theories of management to situations that are relevant to social entrepreneurs and technology entrepreneurs (Mair, Hockerts & Robinson, 2006; Shane & Venkatraman, 2003). Such opportunities lie in the ability to test and refine theories of entrepreneurship, innovation, and strategy in a unique and important setting.

This dissertation provides promising paths for future research in social entrepreneurship, institutional entrepreneurship, and innovation. In these concluding paragraphs, I consider questions for future research, including the relationship between resource-mobilization and opportunity identification. Then, I

discuss the role of collective agency in social-venture founding and organizational-capacity development. Finally, I consider possible extensions to research on institutional entrepreneurship and on innovation in penurious environments.

How are opportunities for social entrepreneurship identified and evaluated? Exploratory research has identified childhood experiences, family background, and professional experiences as playing a role in the making of a social entrepreneur (Barendsen & Gardner, 2004; Sharir & Lerner, 2006). My comparative case study on Benetech suggests a relationship exists between the mode of resource-mobilization and opportunity identification. For example, ventures that use bricolage instead of resource-seeking to mobilize resources may be exposed to different resource sets that influence the nature of the identified opportunities. Future research may help to identify whether the choice of bricolage vs. resource-seeking is related to opportunity identification in certain sectors, or to the identification of opportunities as for-profit versus nonprofit.

What role does local community play in the founding of a social venture? Social enterprises often exist at the nexus of the public and private sectors (Dees, 1998). My empirical study of TSVs demonstrated that collective agency plays an important role in determining venture scalability. One promising avenue for research is in the nature of this collective agency, understanding how suppliers, users, funders, and regulator communities influence the founding, and subsequent product and service offerings of the venture. Such research will shed light on the extent to which social venture founding depends on the individual founders versus

the surrounding collective. Also, whether the surrounding collective agency depends upon the institutional environment.

Much work remains to be done in order to explain how collective agency affects organizational-capacity development, a critical operational measure for many nonprofit organizations. Research on collective agency might illustrate effective ways in which a social entrepreneur should mobilize and manage stakeholders. A consideration of the social networks of the founder and external actors may also highlight how collective agency impacts venture scalability, an area that is less well understood.

How do institutions enable and constrain startup ventures? TSVs provide a promising context in which to study institutional entrepreneurship, the process by which entrepreneurial actors modify institutional structures or create new ones (DiMaggio, 1988; Fligstein, 1997). My dissertation identifies how startup ventures mobilize resources in constrained conditions, under both beneficent and hostile institutional conditions. In the process of resource mobilizing, these ventures often brush against existing political, legal, and technological institutional environments, sometimes building upon their fragments to create new structures. At this early stage, more work is needed to explain the processes by which such institutional transformations might occur.

How does innovation occur in penurious environments? My dissertation identifies the TSVs that operate in resource-constrained environments yet create innovative products and services. Although past research has looked at innovation

in large corporations and well-funded startup ventures, few studies have guided an understanding of how innovation occurs in penurious environments. My dissertation demonstrates that bricolage is an effective way to mobilize resources.

Future research can expand on this finding to explain whether bricolage and resource-seeking produce different types of technological and organizational innovations. For example, research on technological innovation suggests that boundary-spanning mechanisms such as knowledge bridging can produce radical innovations and creative products (Hargadon & Sutton, 1997; Hsu & Lim, 2005). Since social ventures normally operate at the resource-constrained boundaries of different sectors, yet often develop creative products and services, future research on TSV innovation should examine the combined role that bricolage and knowledge-bridging mechanisms play in this process.

Resource-mobilization and technological innovation are becoming increasingly relevant to entrepreneurship practice. The concept of bricolage is uniquely positioned to explain founding and innovation processes in social entrepreneurship, and provides a compelling lens for future research. By applying the concept of bricolage to TSVs, this dissertation helps to highlight the antecedent drivers (funding and institutional support) and consequences (market scalability) of resource mobilization. The hope is that this work will pave the way for subsequent research on TSVs in penurious environments in order to resolve critical social problems by combining technology and entrepreneurial activity in creative and inclusive ways.

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Appendix A: Contemporary Theoretical Perspectives on Resource Constrained Environments.

Perspective	Premise	Resource-mobilizing in constrained environments	Limitation
Resource-Dependence Population Ecology	Nature of resources is largely given and unproblematic. Resources remain objective and definable independent of the specific organization embedded in the resource environment. Resources are what they are -- Organizations either have resources or they do not. Resource Scarcity is a dimension of the environment.	When faced with a new challenge, entrepreneurial firms can attempt two things: Resource-seeking attempts through debt and equity. Ignore new opportunities: Avoidance, Disbanding, and Downsizing.	In theories built on the image of an environment of objective resource constraints, firms appear foolish if acting as if they were not constrained. Yet, firms start and survive despite severe objective resource-constraints (Mahoney & Michael 2005, Kodithuwakku & Rosa 2002)
Resource-Based View	Resources are objective and can include physical resources, labor and skills. Firms obtain services out of these objective resources. Services are contributions that resources make to the operations of the firm. No firm perceives the complete range of services available from any resource.	Each firm is unique in its idiosyncratic relation to the resource environment. Firm differences arise because different firms elicit different services from the same set of resources. Same resource may be worthless to one firm but valuable to another.	The theory provides an explanation for the continuing growth of established firms (Penrose 1959). It does not explain how firms construct these idiosyncratic resource environments in the first place. It downplays the role of managerial discretion and choice (Mosakowski 2002, Barney 1991)
Bricolage	Firms make do with the resources at hand. Firms refuse to enact limitations of commonly accepted definitions of material inputs, practices definitions and standards. Firms instead try out solutions, observe and deal with results.	Firms use combinations of existing resources for new purposes. The process of combining resources, serves as a mechanism for driving the discovery of "new services" from existing resources at hand. The resources at hand are often available for free or cheaply, because others judge them to be useless or substandard.	Bricolage involves idiosyncratic combinations of heterogeneous resources to address new problems and opportunities. These combinations can be easy for other firms to copy (Baker & Nelson 2005: 362). Firm-level bricolage is more a tool of value creation than value appropriation. Bricolage does not explain how created value can be rendered inimitable.

Appendix B: Entrepreneurship constructs at the idea, founding and growth stages of the Benetech ventures.

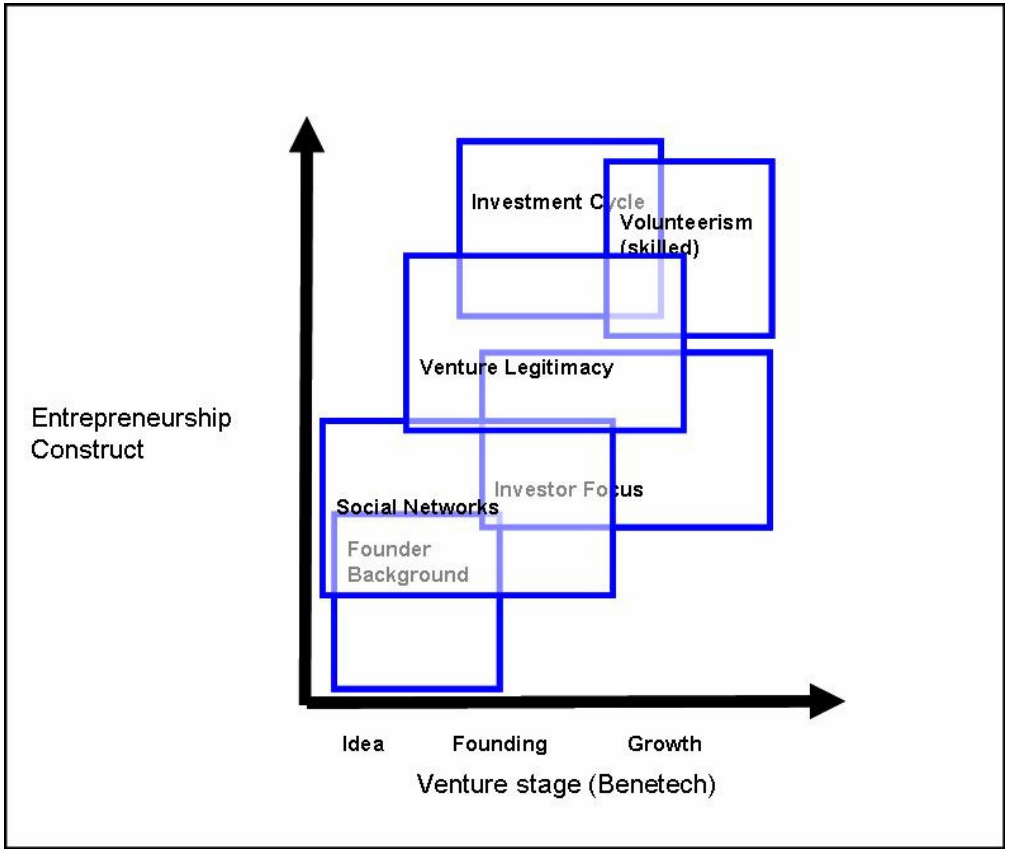
	Founder Background	Social Networks	Investor Focus	Venture Legitimacy	Volunteerism (skilled/unskilled)	Investment Cycle	Project Status (ca. 2006)
Idea/Opportunity Stage: Where did the idea come from?							
Bookshare.org	Y	Y	N	N	N	N	
Martus	Y	N	N	N	N	N	
HRDAG	Y	Y	N	N	?	N	
All-Link	N	Y	Y	N	?	Y	
Bookaccess	Y	N	Y	N	Yu	Y	
Landmine Detector Project	Y	Y	Y	N	N	N	
Libre	N	Y	N	N	N	N	Stall at this stage
ReadingCam	N	Y	N	N	N	N	
	5Y/3N	6Y/2N	3Y/5N	8N	1Y/5N	2Y/6N	
Prototype/ Founding Stage: Who contributed to prototype development?							
Bookshare.org	Y	Y	Y	Y	Yu	N	
Martus	N	Y	N	Y	N	N	
HRDAG	Y	Y	N	Y	Ys	N	
All-Link	Y	Y	Y	N	Ys	Y	Currently at this stage
Bookaccess	N	N	Y	Y	Yu	Y	Terminated
Landmine Detector Project	N	Y	Y	Y	Ys	Y	Currently at this stage
Libre	na	na	na	na	na	na	
ReadingCam	Y	Y	Y	N	N	Y	Stall at this stage
	4Y/3N	6Y/1N	5Y/2N	5Y/2N	5Y/2N	4Y/3N	

Appendix B (contd): Entrepreneurship constructs at the idea, founding and growth stages of the Benetech ventures.

Growth Stage: What factors did the venture focus upon during growth?

	Founder Background	Social Networks	Investor Focus	Venture Legitimacy	Volunteerism (skilled/unskilled)	Investment Cycle	Project Status (ca. 2006)
Bookshare.org	N	N	Y	Y	Ys	Y	Used by universities and schools, 25000 book collection
Martus	N	Y	Y	Y	Ys	N	Used in 43 countries, 10 languages
HRDAG	Y	Y	Y	Y	Ys	N	Acquired by Benetech from AAAS
All-Link	na	na	na	na	na	na	
Bookaccess	na	na	na	na	na	na	
Landmine Detector Project	na	na	na	na	na	na	
Libre	na	na	na	na	na	na	
ReadingCam	na	na	na	na	na	na	
	1Y/2N	2Y/1N	3Y/0N	3Y/0N	3Ys/0N	1Y/2N	

Appendix B (contd): Entrepreneurship constructs at the idea, founding and growth stages of the Benetech ventures.



Appendix C: Inter-rater reliability check for Resource-Seeking (R) and Bricolage (B)

#	Resource-Mobilizing Dimension	Activity Description	Rater 1	Rater 2	Inconsistency
1	Material	Existing Arkenstone computer hardware and pattern recognition software is used for the Bookshare project.	B	B	0
2		Existing hardware from the Bookshare project was used to design the Martus prototype. Software was written by Patrick Ball, drawn from past AAAS programming experience.	B	B	0
3		Resource-seeking - External resources were purchased at project founding: The Science and Human Rights Program obtained hardware and software to study the link between environmental protection and human rights.	R	R	0
4		The Route-66 project uses technology and research designed specifically for developmentally disabled children.	R	R	0
5		Pre-existing Bookshare software is used for the Bookaccess project.	B	B	0
6		Benetech partners with USAID. Books, scanners, choppers and computer servers are purchased and shipped to Iraq.	R	R	0
7		Uses hardware and software resources external to Benetech, the parent organization. The Landmine Detector Project adapts the latest military mine detecting technology into a humanitarian de-mining tool.	R	R	0
8		Existing Benetech resources are used to run the discussion group and create product specifications.	B	B	0
9		Customizes an existing Ipaq handheld to demonstrate prototype of a talking device to aid blind people. Obtains software resources from partner SRI for the speech engine.	B	B	0
10	Labor	The Arkenstone engineering team is employed and new hires are made to fulfill specific roles in content accumulation and distribution.	R	R	0
11		secured the volunteer services of technologists and business leaders to advise and support projects.	R	B	**1**
12		Patrick Ball (technical advisor) and Marc Levine are employed to complete the prototype design.	R	R	0
13		Rafe Kaplan (software engineer) and Miguel Cruz (systems and networking expert) to AAAS; statistician Jana Asher were employed to develop the statistical data analysis software.	R	R	0

Appendix C (continued): Inter-rater reliability check for Resource-Seeking (R) and Bricolage (B)

#	Resource-Mobilizing Dimension	Activity Description	Rater 1	Rater 2	Inconsistency
14	Labor (continued)	A computer science class at UNC devoted labor specifically to developing the project. Benetech also conducted staffing especially for the Route 66/ALL-Link project.	R	R	0
15		Benetech dedicates employee time and skill to the Bookaccess project, by getting funding from the USAID project. Shipping and customs agents were hired to provide expertise on shipping the book container to Iraq.	R	R	0
16		Parag Mody and Ted Driscoll are hired as Benetech Fellows to develop a solution for landmine detection.	R	R	0
17		Discussion list provides interested bystanders an opportunity to provide feedback on the open-source project.	R	R	0
18		Benetech engineers and partners from SRI volunteer time to the idea. Developed through a brainstorming session at Benetech of interested parties.	B	B	0
19	Skills	Bookshare.org employed Jane Simchuck, Alison Lingane, Janice Carter with prior related professional experience.	R	R	0
20		Patrick Ball and Marc Levine use self-taught skills and lessons from the field to complete the Martus prototype.	B	B	0
21		Bricolage - Patrick Ball used self taught skills and field experience on human rights program requirements.	B	B	0
22		Resource-seeking - Two software engineers were professionally trained in the area.	R	R	0
23		Karen Erickson of UNC has professional training and experience on the subject of the learning impaired tools. The project is handed on to a class at UNC to design the next stage of All-Link.	R	R	0
24		The Benetech team uses their prior Bookshare experience to create the ALL-Link online prototype.	B	B	0
25		The Bookshare team uses self-taught skills to try and extend Bookaccess into Iraq.	B	B	0
26		Self-taught skills are insufficient, and external expertise is contracted to fulfill shipping and customs regulations.	R	R	0
27		Ted Driscoll has past professional experience in the area of sensor development, Parag Mody a former senior Sun engineer is helping to cost reduce the project.	R	R	0
28		Discussants use self-taught skills about open source projects to suggest design for Libre.	B	B	0
29		SRI has professional programming experience for handheld readers. Benetech engineers have professional backgrounds in programming.	B	R	**1**
				Errors	2
				Out of	29

Krippendorf's Alpha: 0.83
Cohen's Kappa: 0.81

Appendix D: The Tech Museum of Innovation Awards Application Questionnaire

Problem Identification
What serious problem or challenge with broad significance does your use of technology address?
Explain your context

Description of Technology Application
Fully describe the technology application.
What technology is being used?
How is it being used?
Who is responsible?
Who is benefiting?
What processes or systems are in place to deliver this technology application?
[What are] the existing conditions that you are trying to improve or rectify.

Explanation of Leading Edge or Breakthrough Technology
Why do you think that your use of technology is worthy of recognition?
Describe if it is a new technology or a new use of an existing technology.
How can it be distinguished from existing uses?
Explain how it surpasses previous or current solutions.

Evidence of Contribution
How do you know that your application of technology is making a contribution?

Presentation of Measurable Results
Describe the method(s) you are using to measure your results.
How are you reporting your results and to whom?
To whom are you accountable?

Description of Potential Negative or Unintended Consequences
Describe any outcomes that may not be beneficial that you have considered.
Who might consider your application problematic and why?

Discussion of Replication Potential
Describe how your work can be a model for others to emulate.
Could this application be put to use in other places or context

Vita

Geoffrey Desa was born in Bombay, India. He completed his B.S. in Electrical Engineering from Georgia Institute of Technology in 1999 and his M.S in Electrical Engineering from Stanford University in 2001. He earned a Doctor of Philosophy in Business Administration from the University of Washington in 2008.