Frugal innovation: Social entrepreneurs' perceptions of innovation under institutional voids, resource scarcity and affordability constraints

by Yasser Ahmad Bhatti

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قَالَ يَٰقَوۡمِ أَرَءَيۡتُمۡ إِن كُنتُ عَلَىٰ بَيِّنَةٖ مِّن رَّبِّي وَرَزَقَنِي مِنۡهُ رِزۡقًا
حَسَنٗاۚ وَمَآ أُرِيدُ أَنۡ أُخَالِفَكُمۡ إِلَىٰ مَآ أَنۡهَىٰكُمۡ عَنۡهُۚ إِنۡ أُرِيدُ
إِلَّا ٱلۡإِصۡلَٰحَ مَا ٱسۡتَطَعۡتُۚ وَمَا تَوۡفِيقِيٓ إِلَّا بِٱللَّهِۚ عَلَيۡهِ تَوَكَّلۡتُ وَإِلَيۡهِ
أُنِيبُ ٨٨

I only desire betterment to the best of my ability; and my success can only come from God. In Him I trust, and unto Him I look. 11:88

I dedicate this dissertation to my father Dr M. Sharif Bhatti and mother Rabia Sultana for their dream and encouragement to me to do a PhD, and to my daughters Izzah and Shifa as a promise for a better future. I thoroughly enjoyed slowly, but surely working on this dissertation with my daughters sleeping in my arms! And I have always been and always will be grateful to my parents, wife Saba, brothers Mansour bhai and Saud bhai, and all extended family members without whose wishes I would not have attained success. And a special thank you to my brother Mansour bhai who first encouraged me to attend Oxford University in 2002 on a study abroad programme from the US which then gave me the motivation and confidence to pursue a doctorate at Oxford University.

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BASIC OUTLINE AND WORD COUNT

Chapters	Word count main text only	Word count including tables and figures
1. Introduction	1.9K	2.3K
2. Literature Review	13.8K	14.4K
3. Research Methodology and Design	6.5K	7.3K
4. Empirical Results Chapter 1 on "How do social entrepreneurs conceptualize innovation?" Finding of model of innovation 1.	11.5K	15.5K
5. Empirical Results Chapter 2 on "How do they conceptualize innovation under institutional voids?" & "under resource scarcity?" Finding of model of innovation 2.	16K	27.8K
6. Integrative Results & Discussion Conceptual drivers and determinants of innovation under constraints of both institutional voids and resource scarcity. Finding of frugal innovation.	19.5K	23K
7. Conclusion	7.5K	7.5K
Appendix	4K	5.3K
References and Bibliography	**Not included in word count**	
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*Excluding references and appendices

ABSTRACT

Despite some understanding within the development literature about innovation in extreme contexts marked by challenges of institutional voids and resource scarcity, there exists little knowledge within organization theory and strategic management. To extend this understanding, I connect innovation in extreme contexts with research on social and purposeful innovation. But while the literature attributes social innovation to social entrepreneurs, we know little about how social entrepreneurs themselves view innovation. Questions that arise: *How do social entrepreneurs conceptualize innovation broadly and specifically under extreme contexts marked by institutional voids and resource scarcity?* I explore these questions using qualitative, descriptive and analytical methods by studying two communities of globally networked and formally recognized social entrepreneurs. Analysis is at meso level of innovation and value chains but observations are at micro level through document analysis, interviews, and observations.

I reveal perceptions by social entrepreneurs on conceptual drivers, determinants and key features of innovation. The findings help organizational theorists to frame models of innovation to understand innovation among social entrepreneurs broadly and in extreme contexts. In contrast to social innovation presented in current literature, I find innovation among social entrepreneurs is viewed as a disparate range of understandings that stem from varied motivations, means and outcomes related to social concerns as well as user, efficiency, and challenge concerns. I further find that social entrepreneurs turn to a mix of technology, social, and institutional innovations to deal with, make use of, or overcome constraints. The varied concerns and approaches to innovation can be condensed using the construct of 'frugal innovation' which helps provide some cohesion to the seemingly disparate notions of innovation among social entrepreneurs. I build propositions from the findings and suggest models of innovation that help develop a theory of frugal innovation with implications and lessons relevant for theory, practice, policy and future research.

(300 words)

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LONG ABSTRACT

I take up the question of how actors conceptualize innovation in extreme contexts marked by resource constraints and institutional voids. We know much about how innovation differs across sectors, types of organizations, geographical locations, and across individuals such as entrepreneurs and managers. But we know little about how situated actors conceptualize and account for innovation. The focus on models of innovation and specifically on how actors understand innovation is an opportunity to study innovation out of the status quo and in unique contexts. Despite some understanding within the development literature about innovation in extreme contexts marked by challenges of institutional voids and resource scarcity, there exists little knowledge within organization theory and strategic management. To extend this understanding and knowledge, I connect innovation in extreme contexts with another emerging field of activity – research on broadly social and purposeful innovation, rather than the status quo focus on technology innovation.

Social entrepreneurs are especially relevant to my thesis since we know little about how they conceptualize innovation in extreme contexts. The broad claim about social entrepreneurship is that this is market-based activity focused on societal change. And while the literature attributes social innovation to social entrepreneurs, we know little about how social entrepreneurs themselves view innovation. This qualitative descriptive study fills that gap by investigating how social entrepreneurs view or conceptualize innovation. I also study social entrepreneurs as an ideal use case because literature posits that social entrepreneurs function in extreme conditions marked by both resource constraints and institutional voids. The purpose is to reveal insights on how organizational theorists can better frame models of innovation to understand innovation among social entrepreneurs and in extreme conditions.

This project opens a different direction by asking: How do social entrepreneurs conceptualize innovation broadly and specifically under extreme conditions marked by institutional voids and resource scarcity? The main thesis question is broken down into the following three sub questions:

1. How do social entrepreneurs conceptualize innovation?
2. How do they conceptualize innovation under institutional voids?
3. How do they conceptualize innovation under resource scarcity?

Descriptive research on management and strategy practices uses fieldwork, interviews, and observations to create models of understanding, theory generation and eventual paradigms. I therefore explore the three questions using qualitative methods by studying two communities of globally networked and formally recognized social entrepreneurs, many building technology- and science-based ventures but inspired by social impact. Analysis is at meso level of innovation and value chains but observations are at micro level through business plan summaries, interviews with entrepreneurs, investors, and academics, and observations at an annual intensive social entrepreneurship and innovation 'boot-camp'. I conducted two international trips for fieldwork spanning four months, collected 81 interviews and 163 archival innovation related documents.

The study reveals perceptions by social entrepreneurs on conceptual drivers, determinants and key features of innovation and helps organizational theorists to frame models of innovation to understand innovation among social entrepreneurs broadly and in extreme contexts. In contrast to the coherent phenomenon of social innovation presented in current literature, I find innovation among social entrepreneurs is viewed as a disparate range of understandings that stem from varied motivations, means and outcomes. These motivations and means draw from social concerns as well as user, efficiency, and challenge concerns. I further find that social entrepreneurs turn to a mix of technology, social, and institutional innovations to deal with, make use of, or overcome resource and affordability constraints and institutional voids. I reveal that these varied concerns and approaches to innovation are summarized by social entrepreneurs through the concept of 'frugal innovation'. This new concept provides some cohesion to the seemingly disparate notions of innovation among social entrepreneurs. I build propositions that stem from the findings of diverse perceptions of what innovation is for and among social entrepreneurs and suggest models of innovation that help to propose a theory of frugal innovation with implications and lessons relevant for theory, practice, policy and future research.

(653 words)

1 INTRODUCTION

1.1 Motivation & objective

Fagerberg (2005) reviews the broad area of innovation studies and identifies four emphases in the research literature; 'innovation in the making', 'the systemic nature of innovation', 'how innovation differs', and 'innovation and performance'. My work builds out from this question of 'how innovation differs'. We know much about how innovation differs across sectors, types of organizations, geographical locations, and across individuals such as entrepreneurs and managers. But we know little about how social entrepreneurs (Mair and Marti´ 2006; Elkington & Hartigan 2008) as opposed to commercial entrepreneurs (Sarasvathy 2001; Austin, Stevenson, & Skillern 2006) conceptualize models of innovation (Guillén 1994; Sarasvathy 2001; Marinova and Phillimore 2003; and Mair, Battilana, & Cardenas 2013). The focus on models of innovation and specifically on how social entrepreneurs understand innovation is an opportunity to study innovation out of the status quo and in unique contexts.

Literature review reveals that despite some understanding in the development literature, there is little knowledge in organization theory and strategic management on how innovation takes place within both simultaneous challenges of institutional voids and resource scarcity. I connect this with another emerging field of activity – research on broadly social and purposeful innovation, rather than the status quo focus on technology innovation. The broad claim about social entrepreneurial activity is that this is market-based innovation focused on societal change (Nicholls 2006a; 2006b; Nicholls and Murdock 2011). Much of the research on social entrepreneurship is focused on who are social entrepreneurs and what they do. And this population is especially relevant to my thesis as I will show in the literature review, we know little about how they conceptualize innovation in extreme contexts marked by simultaneous concerns for resource constraints and institutional voids.

1.1.1 Why focus on innovation?

Studies in strategy under contingencies such as institutional voids and resource constraints or scarcity have focused on MNC and large business group strategies (Khanna and Palepu 1997; 2006), entrepreneurship (Tracey and Jarvis 2007; Tracey and Phillips 2011; Puffer, McCarthy and Boisot 2010), social entrepreneurship (Mair and Marti 2009), and market building (Mair, Marti, & Ventresca 2012). The study of actors situated in innovation value chains (c.f. Hansen and Birkinshaw 2007; Roper, Du, and Love 2008) under contingencies may help bridge the different perspectives in previous studies on entrepreneurial or large business strategic response to institutional voids or resource constraints. Also through focus on innovation, we may show how both challenges can be better understood and overcome.

In general, institutionalists have not paid much attention to the origins of innovation (Lounsbury and Crumley 2007). While there exists work on how social entrepreneurs operate under simultaneous concerns for institutional voids and resource scarcity (c.f. Dart 2004; Haugh 2005; Seelos & Mair 2005; Austin, Stevenson, and Skillern 2006; Mulgan et al. 2007a; 2007b; Desa 2009a; 2009b; Mair & Marti 2009; Mair, Marti and Ventresca 2012; Miller, Grimes, and Vogus 2012), there is little work on how innovation is viewed or understood by social entrepreneurs. I argue that if we focus on innovation, we may be able to show how both challenges interplay simultaneously as perceived by social entrepreneurs and better understood how these challenges are dealt with. Consequently, the study of innovation as the unit of analysis may help bridge the different perspectives in previous studies on entrepreneurial and large business response to institutional voids and resource constraints.

1.1.2 Why focus on both institutional voids and resource scarcity?

Much work on innovation has explored 'innovation under constraint'. These constraints take a variety of forms. But this literature has typically focused on resource constraints (Nohria and Gulati 1996; Rao and Drazin 2002) in the absence of formal institutional contexts (North 1990; Altenburg 2009). While some have looked at the enabling effect of resource constraints on innovation outcomes, most have argued that resource constraints have an inhibiting effect on innovation and that slack supports creativity and innovation (Weiss, Hoegl, and Gibbert 2011). Research in creative cognition psychology finds actors are most innovative when given fewer rather than more resources, supporting the hypothesis that "less is more" (Gibbert, Hoegl, and Valikangas 2007, p.16). And other work has provided largely anecdotal evidence that remarkable, and even disruptive innovation, outcomes can be achieved with constrained financial resources as well as lack of formal institutions (c.f. Hart and Christensen 2002; Christensen, Baumann, Ruggles and Sadtler 2006; Bold 2011; Govindarajan and Ramamurti 2013). Some emerging work on innovation under the dual constraints points to new analytic issues such as the rising popularity of innovation in developing and emerging markets (Bhatti, Khilji, and Basu (2013) and the more general concern with Bottom or Base of the Pyramid markets (Prahalad 2005).

The idea that resource scarcity can be an impediment to innovation as well as an enabler to identify new opportunities and enforce efficiency in innovation can allow us to identify perceptual norms among entrepreneurs who face resource constraints. And the idea that institutions can be formal as well as informal can allow us to identify perceptual norms among entrepreneurs who seek to fill the structural voids or deal with complexities in their operating environment.

1.1.3 Why social entrepreneurs as a study population?

Literature often attributes social innovation to social entrepreneurs (c.f. Seelos and Mair 2005; 2007; Phills, Deiglmeier, and Miller 2008; Pol and Ville 2009; Minks 2011), but we do not know empirically much about how social entrepreneurs conceptualize social innovation or even innovation in general. It is worthwhile to study not only what they do in practice but also how they conceptualize innovation. Such an investigation can provide insights into furthering models of innovation among social entrepreneurs (Mair, Battilana, & Cardenas 2013) as well as those models that scholars have built up over the years among commercial entrepreneurs (c.f. Guillén 1994; Sarasvathy 2001; Marinova and Phillimore 2003). So the vocabularies social entrepreneurs use and generate reveal insights on what they think about and how they conceptualize innovation. The focus on social entrepreneurs is particularly interesting because social entrepreneurs face two double edged challenges. One, they function within a field where there is a lack of institutions (or many complicated informal ones) and second, they have to deal with lack of resources devoted to social enterprise and innovation (Mulgan et al. 2007). Further, they have to innovate in environments where beneficiaries themselves reside in environments marked by institutional voids or complexities (Mair, Marti and Ventresca 2012) and do not have adequate resources (Hart and Prahalad 2002; Prahalad and Hammond 2002; Prahalad 2005). However, as I discover based on literature search and review, there is insufficient literature, if any, on how innovation is understood by social entrepreneurs who operate *simultaneously* under institutional voids and resource scarcity.

1.1.4 Identifying unexplored literature

I draw from two main streams in the literature: Innovation Studies and Social Entrepreneurship as shown in figure 1.1. I find that the innovation literature (stream 1) looks at innovation under constraints of either institutional voids or resource scarcity. Few if any studies on innovation have combined the challenge of both simultaneous constraints of institutional voids and resource scarcity. But the social entrepreneurship literature (stream 2), argues that social entrepreneurs have to function and innovate in extreme conditions marked by both institutional voids and resource scarcity. So this study seeks to advance models and theory of innovation by bridging the literatures on innovation with social entrepreneurship and institutions and resources, specifically the lack thereof. A study of innovation under constraints as perceived by under theorized actors such as social entrepreneurs may help to reveal new insights into how innovation may be conceptualized differently (Fagerberg 2005).

<See figure 1.1, page 22>

1.2 Research questions

I take up the question of how actors conceptualize innovation broadly and in unique and extreme contexts marked by resource scarcity and institutional voids. The main thesis question is: *How do social entrepreneurs conceptualize innovation broadly and specifically under extreme conditions marked by institutional voids and resource scarcity?*

This is broken down into the following three sub questions:

1. *How do social entrepreneurs conceptualize innovation?*

   Objective: To investigate through exploratory and descriptive analysis what social entrepreneurs think about innovation and say they do as opposed to what they 'really' do on the ground.

Significance: Contributes to perceptions and key features of models of innovation relevant for management theory and policy.

2. *How do they conceptualize innovation under institutional voids?*

Objective: To determine how this perception and view on innovation is shaped by the notion of institutional voids, or other related idea regarding some form of institutions.

Significance: Contributes to the literature on how contextual conditions based on institutional theory shape models of innovation.

3. *How do they conceptualize innovation under resource scarcity?*

Objective: To determine how this perception and view on innovation is shaped when confronted by the notion of resource scarcity or constraints.

Significance: Contributes to the literature on how contextual conditions based on resource dependency theory shape models of innovation. Further, both questions 2 and 3 together advance our theoretical understanding of innovation under constraints by bridging the literatures on innovation with institutional theory and resource theories.

1.3 Approach and method

The research explores these questions using qualitative methods by studying two communities of globally networked and formally recognized social entrepreneurs, many building technology- and science-based ventures but inspired by social impact. Analysis is at meso level of innovation and value chains but observations are at micro level through business plan summaries, interviews with entrepreneurs, investors, and academics, and observations at an annual intensive social entrepreneurship and innovation 'boot-camp'. I have conducted two international trips for fieldwork spanning four months, collected 81 interviews and 163 archival innovation related documents. I use thematic content analysis

(TCA) and specifically the technique of template analysis to conduct the TCA.

1.4 Findings & contribution

Despite growing interest, current scholarly understanding of innovation among social entrepreneurs is based largely on assumption that social innovation is produced by social entrepreneurs. This assumption has little empirical support and has suffered from a lack of a unified and coherent framework that captures the unique constraining environment under which social entrepreneurs seek to innovate. My work investigates empirically how social entrepreneurs conceptualize innovation and uses these empirical insights to build theoretical models that will be useful in furthering research on how social entrepreneurs innovate.

In acknowledging the risks and limitations of building theory based on innovation as 'socially constructed' through perceptions of social entrepreneurs, I depart from the purely inductive, field-based, and grounded theory approach (Glaser and Strauss 1967) and instead use the methodological approach of retroduction (Ragin 1994; Ragin and Amorosso 2010), as this supports iterative use of deduction based on current knowledge and induction based on emerging evidence.

Models of innovation derived from social entrepreneurs have not been extensively and empirically developed yet, and are important as they can help inform our assumptions on social innovation and other emerging concepts such as frugal, grassroots, and reverse innovation, all sometimes attributed to social entrepreneurs. Consequently, this study advances an understanding of innovation among social entrepreneurs in a number of ways. The first contribution lies in the development of empirically derived models of innovation

(such as those of Guillén 1994 and Sarasvathy 2001) as perceived by social entrepreneurs that outline the hybrid mix of motivations and components of innovation approaches that can help explain emerging trends and multi-dimensional constructs in innovation. The second contribution lies in outlining the constraints within which this innovation is conceptualized and likely practiced and how this context compares with the operational context in which mainstream entrepreneurs innovate. More specifically based on this four year-long study, I am able to make the following specific claims:

On innovation:

1. Social entrepreneurs are involved in more than social innovation.
2. Social entrepreneurs use a combination of existing innovations.
3. Social entrepreneurs were more likely to be concerned about institutional and social innovation than technology innovation.
4. Social entrepreneurs are packing combinations of innovations into new emerging concepts such as frugal innovation.

On constraints to innovation:

5. Extreme contexts marked by constraints are not unique to developing or emerging markets but also exist in pockets of developed markets.
6. Social entrepreneurs and their customers face a combination of constraints to innovation – institutional voids, resource and affordability constraints.
7. Social entrepreneurs are more focused on challenges of resources while investors are more focused on institutional challenges.

On methods:

8. This is one of few qualitative studies to acknowledge the use of retroduction in methods, as opposed to a purely inductive or deductive approach.

Content analyses and thematic coding has revealed intriguing results and two models of innovation. Model 1 on innovation viewed among social entrepreneurs is revealed in chapter 4 and model 2 on innovation under constraints as viewed among social entrepreneurs is

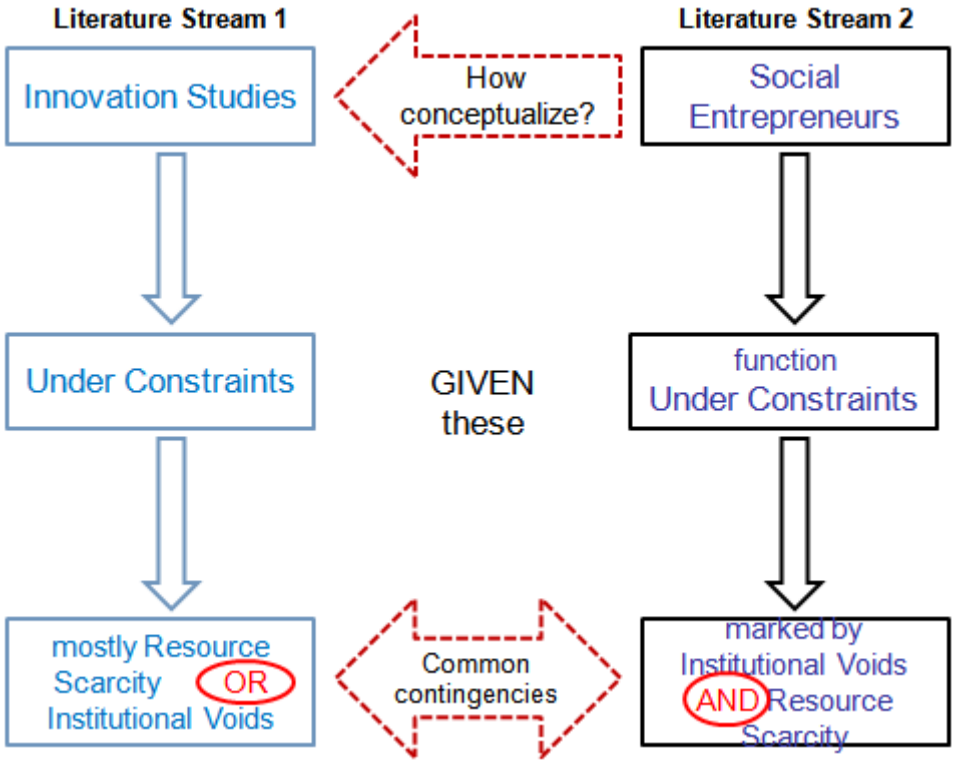
revealed in chapter 5. Chapter 6 integrates lessons from these two models of innovation to suggest a theory of frugal innovation.

In contrast to the coherent phenomenon of social innovation presented in current literature, I find that innovation among social entrepreneurs is viewed as a disparate range of understandings that stem from varied motivations, means and outcomes. These motivations and means draw from social concerns but also user, efficiency, and challenge concerns. Further I find that social entrepreneurs view adopting a mix of technology, social, and institutional innovations to overcome resource and affordability constraints and institutional voids. I find these varied concerns and approaches to innovation are summarized by social entrepreneurs through use of the concept of 'frugal innovation'. This new concept provides some cohesion to the seemingly disparate notions of innovation among social entrepreneurs. The study reveals perceptions on conceptual drivers and determinants, and key features of innovation as viewed among social entrepreneurs, to propose a theory of frugal innovation with implications and lessons relevant for theory, policy and future research.

1.5 Organization of the dissertation

Chapter 2 reviews the literature on innovation and (social) entrepreneurship, chapter 3 covers research methodology, chapter 4 reveals the empirical findings for research question 1, chapter 5 reveals the empirical findings for research question 2 and 3, chapter 6 integrates lessons from all the findings in this dissertation and discusses theory development based on these findings, and chapter 7 closes this study with a discussion of limitations and avenues for future research.

Figure 1.1: Identifying unexplored literature



2 LITERATURE REVIEW

2.1 Introduction

For the literature review that is relevant to this study, I draw on two main streams: the innovation and entrepreneurship literatures, respectively. From within these two higher level streams, I delve into specifically *social* innovation and *social* entrepreneurship. I then refer to literature that positions social entrepreneurship under contexts of constraints i.e., under resource constraints and institutional voids. The sequence of literature review 'sense-making' is summarised in the visual depiction below. The black solid arrows in figure 2.1 show the sequence of linkages in existing literature. The dashed red arrows show the spaces of opportunity between these literature streams from where I draw the three research questions I explore in this study:

RQ1: How do social entrepreneurs conceptualize innovation?

RQ2: How do they conceptualize innovation under institutional voids?

RQ3: How do they conceptualize innovation under resource scarcity?

<See figure 2.1, page 72>

I begin this chapter with a brief introduction to literature on innovation and then delve deeper into social innovation. I identify limitations in the way we understand social innovation, mainly as one where researchers have widely but insubstantially attributed social innovation as the purview of social entrepreneurs (c.f. Seelos and Mair 2005; Phills et al 2008; Pol and Ville, 2009; Minks 2011; Gundry et al 2011). The social entrepreneurship literature argues that what sets social entrepreneurship apart from mainstream

entrepreneurship, is the degree to which social entrepreneurs face, deal with and overcome contextual or external constraints (c.f. Mulgan et al. 2007; Desa 2009; Mair, Marti and Ventresca 2012). These constraints can be broadly categorized as institutional voids and resource constraints. The existing linkages across the five literature streams suggest that we still need to have a better understanding of the fundamental nature of innovation as perceived by social entrepreneurs. Further, there is opportunity to contribute to existing literature by better understanding how innovation is viewed by social entrepreneurs specifically under contextual constraints. A snapshot of some of the salient literature cited is depicted in figure 2.2.

<See figure 2.2, page 73>

2.2 Innovation

As a diverse topic, a variety of disciplines address innovation such as marketing, product development, technology management, organizational behaviour, economics, and sociology. The research links across different fields are not so clear, but I will attempt to provide a theoretical brief of innovation leading to the study of social innovation.

Fagerberg (2005) reviews the broad area of innovation studies and identifies four emphases in the research literature; 'innovation in the making', 'the systemic nature of innovation', 'how innovation differs', and 'innovation and performance'. My work builds out from this question of 'how innovation differs'. One way to understand how innovation may be different is to look at its form and function. Classical economist Joseph Schumpeter (1934a;b) posited that entrepreneurs carry out innovation which can be broken down into following types of innovation:

1) The introduction of a new good or a new quality of the good

2) The introduction of a new method of production
3) The opening of a new market
4) The conquest of a new source of supply
5) The carrying out of the new organization of an industry

Innovation can be defined “as an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers 2003, p. 12). However, to some scholars (c.f. Utz and Dahlman 2007; Foster and Heeks 2013) lack of commercial success or widespread scale up and adoption signals lack of innovative success. More broadly innovation can be considered as a process “to create competitive advantage by perceiving or discovering new and improved ways of competing in an industry and bringing them to market" (Porter 1990 p.45). Since Schumpeter, we have learned much about how innovation differs across sectors, types of organizations, geographical locations, and across individuals such as entrepreneurs and managers. For instance, dominant innovation and diffusion literature has dichotomously (Lynn, Reddy, and Aram 1996) viewed innovation as either competence enhancing or competence destroying (Abernathy and Clark 1985; Tushman and Anderson 1986); architectural or component (Henderson 1993; Henderson and Clark 1990); basic or improvement (Mensch 1979); and product or process (Abernathy and Utterback 1978).

Another way of looking at the trajectories in innovation studies is to understand the field as split in to two overarching themes: One, the problem of generating innovations which involves the “where from” and “how to” and two, the problem of what happens to innovations once they are produced, “diffusion” and “market outcome” (Drazin and Schoonhoven 1996). While both have provided concepts and frameworks to understand and analyze innovation creation and diffusion, they have been criticized (Lynn et al 1996) for neglecting wider interactive effects such as diffusion, use, and end-user improvement, for inadequately considering the 'systems' nature of most technological innovations (Hughes

1983; Freeman 1995; Rosenberg 1979) and for reducing technological innovation to a simple reactionary response to demand and pull from consumer needs (Dosi 1982; Mowery and Rosenberg 1979).

From the above we see that innovation research and studies have often been marked by a technology bias as well as an economic bias (Roth 2009; Rennings 2000). The dimension of artefacts constituting products, ideas and methods is often associated with technology bias in the present discourse on innovation (Roth 2009; René 2005). But for purposes of this study, there is a growing interest in the social dimension of innovation (Mulgan 2006) or 'social innovation', and in general, institutionalists have only recently begun to study the origins of innovation (Lounsbury and Crumley 2007).

2.3 Social innovation

Lawrence, Phillips and Tracey (2012, p.321) define social innovation as one that "involves the transformation of social systems in ways that both address social problems in a practical sense and shift our ways of thinking about these problems." In comparison to dominance of business and technology innovation, there has been scant systematic analysis of the design, diffusion and support of social innovations (Foundation 2012). Although innovation studies are dominated by technical innovation (Roth 2009), there is evidence that the notion of social innovation is present in the early works of economists Joseph Schumpeter and Nikolai Kondratiev (Kesselring 2009). Schumpeter distinguished between product, process, procedural and organizational innovations to tap new markets. However in order to assure the economic efficacy of technical innovations, Schumpeter emphasised the importance of social innovation in the economic arena as well as in culture, politics and a society's way of life (Howaldt and Schwarz 2010). In fact, the trajectory of technological

innovation, economic performance and consequently social change predates Schumpeter in the works of classical sociologist Karl Marx and political economist Adam Smith. Around the same time as Schumpeter, sociologist Ogburn (1937) was one of the first to distinguish technology and social innovation, but he still assumes the primacy of technology as a precursor and driver of social change (Howaldt and Schwarz 2010).

Since classical economists, the focus of innovation studies over most of the second half of the 20th century has almost exclusively been on technology innovation. The attention to social innovation in literature since Schumpeter is rare and marginal (cf. Moulaert et al. 2005). Only since two decades ago has social innovation gradually enjoyed a surge in interest. Public discourse is increasingly focused on social and economic problems prompting a call for extensive social innovation (Howaldt and Schwarz 2010). Despite this growth in attention on social innovation, it is still elusive with regard to terminology, concept and content (Howaldt and Schwarz 2010). Consequently, "the field of social innovation remains relatively undeveloped" (Mulgan et al. 2007, p.3). The British newspaper *The Guardian* writes "Social innovation is the new global obsession. It might be a nebulous idea but it has huge potential…The language around social innovation easily slides into smoke and mirrors." (Roberts 2008).

The rising popularity of social innovation is associated with increasing social, environmental and demographic challenges (Foundation 2012). These challenges are exacerbated due to ambitions of the modern welfare state, the limitations of conventional market capitalism, deepening climate change, ever-increasing and ageing population and the associated care and health costs, the impact of globalisation, the impact of mass urbanisation and for purposes more relevant to this study, scarce and finite resources (Foundation 2012). Each of the private and public sectors and civil society individually have been unable to cope

with these challenges because of market failure in private sector, silos in public sector, and lack of scalability and fragmentation in civil sector (Foundation 2012).

But the delineation of social innovation is not just an inquiry of academic concern. According to Mulgan (2006), "the pace of social innovation will, if anything, accelerate in the coming century" (p. 145). Policy makers are interested in using and managing advanced social indicators of innovation (Moris, Jankowski, and Perrolle 2008) and proposed systemic policy views (Soete 2007; 2008). The concept of social innovation is not established in social theory (Aderhold 2005) and what we need are in fact greater theoretical and empirical studies on social innovation as innovations in their own right (Kesselring 2009). Kesselring's study of social innovation helps distinguish social innovation from social change -- a social change may ensue following concerted efforts to innovate. However it is difficult to delineate social innovation as almost any type of innovation that transforms societal practices to be defined as a social innovation such as a sect (Cornwell 2007), the eBook (Cavalli 2007), or scientific management (Mumford and Moertl 2003). Roth (2009) contends that even economic innovations are one type of social innovation since most are the outcome of societal efforts (Barré 2001; Nowotny, Scott and Gibbons 2001) or the result of the co-evolution of both economic and non-economic functional systems of society (Etzkowitz and Leydesdorff 2000; Leydesdorff 2005). Mulgan et al. (2007, p. 9) define "social innovations as the development and implementation of new ideas (products, services and models) to meet social needs." But here also Mulgan et al make a distinction between social needs of the society as a whole from the individual based on "merely personal needs or demands". Nevertheless, the real potential of innovation is in fact in its social dimension (cf. Roth, 2009; Pot and Vaas 2008).

Even so, social innovation is presented as a secondary phenomenon which ensues as social change to technological and economic innovation, a view still dominant today (Roth

2009). For instance, Moulaert et al (2005) comment that in the field of urban planning an overly technological focus paved way for greater support for social innovation to theorise human development, empowerment and local development strategies (Foundation 2012; cf. Gerometta, Haussermann, & Longo 2005). Desa's dissertation (2009a) was one of few recent and substantial works that helped to bridge the dominant focus on technology and the secondary focus on social innovation by exclusively studying technology ventures engaged in social innovation. Desa's subsequent work (2011) provides insights on how technology is used directly to address social problems in an economically sustainable manner.

When we look beyond a technological focus, we begin to see social innovation as embodying variety of actors and missions. Murray, Calulier-Grice and Mulgan (2010) stress not only new ideas including products, services and models, but also the creation of new social relationships or collaborations in the process to meet social needs. A report on social innovation by The Young Foundation commissioned by the European Commission (2009) presents that first, social innovation cuts across different private, public and civil sectors even though most literature on social innovation tends to study it within a specific sector. But when taken together, the literature shows that social innovation takes place in all three sectors, and often at the intersections of these sectors. Social ventures are deemed to operate at the nexus of economic, public, and community sectors (Dees 1996; 1998; Mair & Marti 2006) or at the intersection of multiple institutions such as the market, government, and the community (Desa 2009a; Shaw & Carter 2004). Issues such as governance, empowerment, and capacity building have expounded the dynamics in relationships between different actors and the skills, competencies, assets and social capital brought to the table by these actors (Foundation 2012). The organisations engaged in social innovation are often able to span the intersection of various sectors – thereby being 'hybrid' organisations. One type of this 'hybrid' organization is the social enterprise.

It was believed that social entrepreneurs provide innovative leadership in social enterprises (Dees 1998) and the role of innovation in a social entrepreneurial organization was emphasized (Borins 2000). However much like social entrepreneurship, social innovation has developed with ill-defined boundaries, meanings and definitions (Foundation 2012). But the understanding of social innovation has been more ephemeral in the literature than social entrepreneurship, the latter which has benefitted from greater traction with relatively well defined concepts, definitions and analyses (cf. Nicholls and Murdock 2011; Mair and Marti 2009). Moreover, the Young Foundation (2012) contends that social innovation is far broader than social entrepreneurship, which poses both opportunities and challenges to knowledge discovery and use. According to a review of the literature in the same report, Hamalainen and Heiskala's (2007) five types of innovation; technological, economic, regulative, normative and cultural taken together form the sphere of social innovations.

The stream of social innovation literature that this work builds upon, describes social innovation as the work of social entrepreneurs, emphasising the role of individuals' to develop innovative solutions for difficult social challenges (Bornstein 2004; Bornstein and Davis 2010; Dees and Anderson 2006; Goldsmith 2010; Hartigan and Elkington 2008; Hoogendoorn, Pennings and Thurik 2010). Nicholls and Murdock (2011) found in review of the literature, that social innovation research can be understood as focusing on 'systems and processes of change in social relations' at one extreme and 'innovation in the conceptualisation, design and production of goods and services that address social and environmental needs and market failures' at the other extreme. Moreover, social innovation is a practice-led field which is contextually based (Foundation 2012). Most work has been on successful case studies rather than on understanding patterns and stages of social innovation (Foundation 2012). And most literature on social innovation has focused on the process

perspective of social innovation touching upon more practical concerns on how to develop and implement “successful” programmes and strategies. A case in point is the book, "The Social Innovation Imperative" by Bates (2011) which is purported to be first book that presents a detailed, structured methodology for social innovation derived from academic models and practical experience. It seeks to provide a 'how-to' to address ‘wicked problems’ such as health care, education, poverty, disaster response, neglected elderly, and environmental destruction. These issues are termed so because they are complex issues that involve several different constituents, many of which have conflicting or competing objectives (Bates 2011). But even this book fails to adequately shed theoretical insights on how social entrepreneurs themselves perceive social innovation or even innovation in general. Although practice is important, we can also learn a lot from how people think and perceive concepts, thereby building additional layers of knowledge to what we already know.

I argue that before we can begin to look at the practical concerns on what may entail good or bad strategies for social innovation that might be pursued by social entrepreneurs, social scientists must pay more attention to the way social entrepreneurs conceptualize or perceive social innovation as a construct, phenomenon, or concept. And there is little work on the conceptualization of innovation among social entrepreneurs. So this dissertation moves away from the more practice led approach to a more conceptual approach, as this will be useful for generating models and concepts of innovation as opposed to simply describing what social entrepreneurs actually do on the ground. Some of the unaddressed questions in social innovation research include: Is social innovation perceived collectively as one or as varied constructs? To what extent do academic conceptualizations of social innovation match or differ from those of actual social entrepreneurs? Towards paving the way to answer these questions, I propose to move a step back and explore in this dissertation the fundamental question, “how do social entrepreneurs perceive innovation?” The gaps in the literature

suggest that this work will be a seminal study in delineating social innovation into models of understanding based on empirically gathered perceptions of social entrepreneurs. As such this study helps to understand patterns and concepts of innovation by social entrepreneurs and it does not seek out successful cases but rather looks at early stage social entrepreneurs, who may not all be considered "successful". Further the geographical and sectoral diversity of informants in this study provide for a more encompassing perspective of innovation by social entrepreneurs.

2.4 Social entrepreneurship

Social entrepreneurship and social innovation have often been intertwined to the extent it can be hard to distinguish the two. Tracey and Jarvis (2007) claim that social entrepreneurship is often defined as innovation that leads to positive social change. This is perhaps due to the fact that the notion of trading for a social purpose is at the core of social entrepreneurship (Travis and Jarvis 2007). A prevalent understanding of social entrepreneurs is that their primary objective is to create social value while a secondary but necessary objective is to also create economic value to ensure financial viability (Mair and Marti´ 2006).

There is increasing interest among both researchers and practitioners about market based solutions to social issues (Miller et al 2012). A social issue refers to concerns such as poverty, illiteracy, and unemployment which is "a putative condition or situation that is labelled a problem in the arenas of public discourse and action" (Hilgartner & Bosk 1988: 53–54). When social issues are resolved in a way that "achieves an equivalent social benefit with fewer dollars or creates greater social benefit for comparable cost" (Porter & Kramer 1999: 126), this process can be called social value creation (Miller et al 2012). Similarly, the

proceeds of social benefit go mainly to society, as opposed to an individual or specific organization (Thompson 2002).

With a focus on commercial market activity by social entrepreneurs to create social value alongside economic value, social entrepreneurship in fact has its roots in the study of non-profits. The adoption of business practices in non-profit organizations resonates with the literature about social entrepreneur traditions (Dart 2004 cites examples by Emerson & Twersky 1996; Dees et al. 2001). A focus on the financial bottom line was atypical or uncommon in the non-profit funding and service environment (Dart 2004). But more focus on commercial activity by nonprofits brought more attention to market based approaches focusing on financial bottom line, efficiency and reduced cost structures and market-focused social innovations (e.g. Austin 2000; Emerson & Twersky 1996; Brinckerhoff 2000; Dees, Emerson and Economy 2001). Social enterprises often seek to create social value (Peredo & McLean 2006; Shaw & Carter 2007), through commercial market-based models (Hartigan 2006; Hockerts 2006; Lasprogata & Cotten 2003; Thompson 2002). Desa (2008) finds that social entrepreneurship literature has four broad streams: i) Defining and differentiating the field of social entrepreneurship; ii) Understanding the constraining and enabling role of institutions on social entrepreneurship; iii) Focusing on the resource-constrained environments within which social enterprises operate; and iv) Evaluating the performance metrics for social entrepreneurship. I allude to the first stream, but for this work I draw mainly from the second and thirds streams.

Social entrepreneurs are committed to serving society (Brooks 2008; Nicholls 2006; Austin et al. 2006; Elkington & Hartigan 2008). In contrast, mainstream commercial entrepreneurs primarily seek to create economic value (Austin et al. 2006). In other words, social entrepreneurs look to serve the underserved whose needs are not sufficiently addressed through commercial ventures in market exchange (McMullen 2011). Another way to look at

social entrepreneurship is to understand that benefits accrue primarily to targeted beneficiaries, as opposed to owners (Alvord, Brown, and Letts 2004; Austin et al. 2006; Mair & Marti 2006). Nevertheless, in this process of trading, social entrepreneurs have to exploit market opportunities, assemble resources, and develop products and/or services that help achieve 'entrepreneurial profit' (Schumpeter 1934a). Unlike traditional commercial entrepreneurs who have a single and ultimate goal of financial return, and unlike pure non-profit entrepreneurs who have a single and ultimate goal of social philanthropy, social entrepreneurs have dual goals of providing both mission-related social outcomes as well as market-based outcomes (Desa 2011).

Despite some of this common understanding of social entrepreneurship, there are several variations in definition of social entrepreneurship (Lepoutre Justo, Terjesen & Bosma 2013; Estrin, Mickiewicz, & Stephan 2011; Mair and Marti 2007; Dacin, Dacin & Matear 2010; Short, Moss & Lumpkin 2009). The perspectives on social entrepreneurship also differ widely in international settings ranging from the USA to UK, Europe, Australia and Japan (Defourny & Nyssens 2008; Desa 2009; Zahra et al 2008; Ooshima 2009). Estrin, S., Mickiewicz, T., & Stephan (2011) cite Zahra et al. (2009) as having analyzed twenty definitions in a literature review and highlighted three types of social entrepreneurs: social bricoleurs (following Hayek), social constructionists (following Kirzner) and social engineers (following Schumpeter). The social bricoleur responds to local opportunities, acts locally, and uses local resources. The majority of social entrepreneurs may often start as social bricoleurs. The social constructionist realizes that a specific local need is more widespread and creates organisations with scalability. The social engineer may even challenge the wider institutional structures. Model 1 in chapter 4 seems to conform to this typology of social bricoleur (grassroots-based innovation), social constructionist (social-based innovation), and social engineer (efficiency-based innovation) with challenge-based innovation extending this

categorization. Zahra et al's (2009) examples of social entrepreneurs or social engineers who have significant impact on their environment are mainly from the developing world, though not exclusively.

Gundry et al's (2011) work exemplifies the presumed assumption of social entrepreneurship and social innovation. They posit that if social entrepreneurs are primarily concerned with the development of innovative solutions to society's problems; the act of doing so would be social innovation. Social entrepreneur traditions are emphasized by social innovation, entrepreneurial activist, and frame-breaking approaches to non-profit management (Dart 2004). As covered in the preceding section on social innovation, I connect the little we know about the views of social entrepreneurs on innovation with social and purposeful innovation, rather than the status quo focus on technology innovation. The broad claim about social entrepreneurial activity is that this is market-based innovation focused on societal change (Nicholls 2006, Nicholls and Murdock 2011). Fundamentally social entrepreneurship is challenging because it attempts to merge two ostensibly contradictory organizational goals, social value creation and profit generation, in environments where even basic institutional infrastructure may not exist (Miller et al 2012).[1]

But much of the research on social entrepreneurship, as alluded to above, is focused on who are social entrepreneurs and what they do. This is because about a decade ago, a consensus developed that understanding social entrepreneurship and social entrepreneurs is important (Cooperrider and Pasmore 1991; Dees 1998). Nevertheless, literature on social entrepreneurship is fragmented and there is no coherent theoretical framework (Weerawardena & Mort 2006). But in order to focus on the socially innovative perspective by social entrepreneurs, I adopt Mair and Marti's (2006, p. 37) definition of social

[1] In fact, Miller et al also cite one of my respondents' firms, Piramal or Sarvajal Water in their article exhorting researchers to consider emotions in social entrepreneurial behaviour.

entrepreneurship as "a process involving the innovative use and combination of resources to pursue opportunities to catalyze social change and/or address social needs."[2] And like social innovation which is found cutting across multisectors, Bornstein (2004) argues that social entrepreneurship is equally possible in the nonprofit, public, and private sectors. Social enterprises are deemed to consist of different hybrid kind of organizations that exist somewhere in the middle of the "purely philanthropic" at one end to "purely commercial" on the other (Dees 1998).

Previously conceptualizations of social entrepreneurship failed to adequately consider the context within which they operate (Weerawardena & Mort 2006). Weerawardena and Mort argue that since social entrepreneurship seeks to result in an organization that achieves a sustainable competitive advantage, it should be conceptualized within the broader competitive environment within which it operates. Consequently they find that social entrepreneurship's drive for sustainability is highly influenced and shaped by environmental dynamics. Although there has been increased understanding over the last few years on these contextual dynamics as I shall refer to shortly, there is no work on how innovation is understood by social entrepreneurs who operate under both institutional voids and resource scarcity.

So social entrepreneurs are especially relevant to my thesis since we know little about how they conceptualize innovation in contextual circumstances marked by extremes of poverty, institutional complexities, and resource scarcity. Social entrepreneurship is challenging due to the nature of markets and contexts in which it is practiced (Mair & Marti 2006; Miller et al 2012). And the focus on social entrepreneurs is particularly interesting because social entrepreneurs face two double edged challenges. One, they function within contexts where markets are perceived to have failed (McMullen 2011) or there is a lack of

[2] However what is missing in this definition is the creative use of institutional complexities.

institutions leading to institutional voids (Dart 2004; Haugh 2005; Seelos & Mair 2005; Austin et al. 2006; Mair & Marti 2009; Mair, Marti and Ventresca 2012). Second, they have to function in contexts where there is lack of resources devoted to social enterprise and innovation, such as capital, knowledge or skills in the workforce (Mulgan et al. 2007). And beyond this, they also have to innovate in environments where their prime beneficiaries themselves reside in environments of poor distribution infrastructure and do not have adequate resources to afford relatively higher end solutions (Prahalad 2005).

There exists much work on social entrepreneurship in resource constrained environments. A social entrepreneur whose dual pursuits of social return and financial sustainability (Austin et al 2006), may find him/herself challenged by lack of access to resources, more so than commercial entrepreneurs, due to the conflicting goals of traditional for profit investors and traditional charitable grant makers (Desa 2011). The taken-for-granted schema and beliefs of mainstream resource providers are often in direct opposition to the goals of a social venture (Gair 2005; Koch & Caradonna 2006). Yet, Gundry et al 2011 contend that social entrepreneurship actually flourishes in resource-constrained environment.

It is also widely believed that social entrepreneurship typically emerges in contexts where markets may have failed to some extent (McMullen 2011) or where there are institutional voids (Austin et al. 2006; Dart 2004; Haugh 2005; Mair & Marti 2009; Miller et al 2012; Seelos & Mair 2005). The challenge of reconciling competing objectives by social entrepreneurs is exacerbated within contexts of institutional voids (Dees 1998; Mair & Marti 2009). On institutional voids, Arend (2013) criticizes Miller et al's work for mainly considering contexts where institutions are not broken.[3] According to Arend, this actually runs opposite to expected situations where social entrepreneurship is more suitable. Arend

[3] Miller et al. (2012) try to bring in emotions into the conversation on motivational incentives for social entrepreneurs.

contends it would be more appropriate for Miller et al. to have theorized about how social entrepreneurship arises where institutions are broken, inefficient, or non-existant and about what factors such as networks, resources, and skills are more important, than emotions, in making the venture successful. A view exists in institutional voids literature that sees social enterprises as created to satisfy underserved demand for welfare provision in less developed institutional settings (Estrin, Mickiewicz, & Stephan 2011). Social entrepreneurs assume risks of launching new enterprises but also often assume risks associated with having to build new institutions needed to support the venture (Dacin, Dacin, & Matear 2010; Miller et al 2012). Estrin, S., Mickiewicz, T., & Stephan (2011) propose that while commercial entrepreneurship is primarily influenced by formal institutions, social entrepreneurship is linked to the levels of institutional voids as well as social capital.

In the next section I draw on the institutional stream of social entrepreneurship and then the resource constrained stream. In the institutional stream, studies look at how social entrepreneurship may occur in spite of existing institutions or lack thereof. Such processes that challenge and change institutions may help create new markets. In the resource-constrained stream of the literature studies look at how social enterprises acquire and use limited resources to fulfil their social missions.

2.5 Institutional voids

There is emerging literature on social entrepreneurship from the institutional perspective (Antal 2006; Mair & Marti 2006). One perspective is that social entrepreneurs often try to fulfil a social need that is unmet due to failures of the institutional ecosystem (Desa 2009). Estrin et al (2011) test whether according to institutional void theory (Dacin et al. 2010; Mair & Marti 2009), deficiencies in the provision of social goods that stem from

lack of strong formal institutions may lead to greater social entrepreneurial activity. Another perspective is that the creation of a start-up itself may lead to changes in existing institutional arrangements (Mair & Marti 2006; Sarasvathy 2006). Given the little understanding we have of institutional change and also the enabling role of institutions, Mair and Marti (2007) suggest that social entrepreneurship can help us to understand how institutional voids serve as opportunity spaces for institutional entrepreneurs.

Institutional theory as it pertains to firms draws broadly from two strands. One draws mainly from economics (North 1990), whereby firm decision making and action take place in response to political and governance related dependence and uncertainty. Second draws from sociology (DiMaggio & Powell 1983), according to which firms gain legitimacy by conforming to normative and regulatory pressures. Organizations adapt to the prevailing beliefs, norms, and rules of the environment (DiMaggio and Powell 1983; Meyer and Rowan 1977). Institutions mainly denote shared conceptions and constraints that shape interaction which constitute the rules of the game for doing business and can be defined as the humanly derived constraints that structure how humans interact. These constraints can be formal constraints as in the case of formal rules, laws, and constitutions, or they can be informal constraints as in the case of norms of behaviour, conventions, and codes of conduct (North 1990). Institutional concerns such as legal recourse and political structure are global concerns for anyone instituting change and innovation in institutionally complex contexts (Mair, Marti and Ventresca 2012). Yet, perhaps for these challenges, these are the environments where social enterprises look to provide solutions for and operate in (Mair & Marti 2009; Sarasvathy 2006).

In contrast to well developed institutions, institutional voids are defined as the lack of institutional facilities, norms, and regulations needed for a well functioning economy (North 1990). Many nascent and developing markets fail to some extent in providing necessary

institutions to support basic business operations such as regulatory systems, contract-enforcing mechanisms, financial markets, and even supply-chain infrastructure such as roads, ports, and transportation. All capabilities require institutional backing such as regulatory, health, education, and perhaps the most important, financial institutions and resources. For instance, Johnson et al (2003) mention that in order to build competence and innovate it is important to establish institutions that enhance order, trust and predictability in the life of individuals and in the workings of firms and other organizations.

More recent work has critiqued the "voids" in institutions as not being entirely empty spaces. The lack of efficient institutions suggests that alternative and perhaps more restrictive institutional arrangements are in place (Puffer, McCarthy, & Boisot 2010; Mair, Marti, and Ventresca 2012). For instance, Mair, Marti and Ventresca (2012) suggest local institutions with community or religious logics can be very powerful shapers. So on the one hand, economic institutionalists suggest that the absence of Western notions of market efficiency enhancing institutions leads to institutional voids, and on the other hand sociological institutionalists suggest that other forms of formal or informal institutions lead to institutional complexities, involving both formal and informal institutions that can pose both a challenge as well as opportunity for innovation.

Social entrepreneurship can be viewed as challenging where basic institutional infrastructure may not be in place (Miller et al 2012, Arend 2013). On the one hand, some scholars argue that filling institutional voids raises a serious challenge to social entrepreneurship because it often requires individuals, who have little formal power, to act as agents for change in both market and nonmarket activities (Arend 2013). On the other hand, despite this challenge, other researchers argue that social entrepreneurs view nonexistent markets and institutional voids or complexities as opportunities rather than threats (Dutton 1993). George, McGahan, and Prabhu (2012) posit that constraints and voids can be reframed

whereby they are assumed as inputs to create opportunities. And the enabling role is particularly evident in the domain of social entrepreneurship (Desa 2011).

Mair and Marti (2007) argue that institutional theory largely assumed the durability and stability of institutions, one in which institutions primarily constrain behaviour and one in which there is a circumscribed role of entrepreneurial action (DiMaggio & Powell 1991; Scott 2001). For instance, Meyskens et al (2010) suggest that social entrepreneurship is not a unique field as it shares common characteristics with commercial entrepreneurship. Social entrepreneurs develop innovative solutions to social problems through entrepreneurial activity (Dees 1998; Short, Moss, & Lumpkin 2009). Consequently, most research on entrepreneurship has assumed that the findings from Western contexts in terms of institutional conditions are applicable worldwide to entrepreneurs in different countries (Desa 2011).

Institutional conditions, though, differ across nations (Van Agtmael 2007), and even within nations (Thun 2006). For instance Child and Lu (1996) argue that the economic reform of large state-owned Chinese enterprises moved very slowly because of complex material, relational, and cultural constraints. Especially in emerging economies, the development of market institutions has been even slower and more difficult (EBRD 1998) which has led to missing institutional features such as shortage of skilled labor, thin capital markets, and infrastructure problems (Hoskisson et al 2000). Hoskisson et al (2000) posit since government and societal influences are stronger in emerging economies that are in the early stages of market emergence than in developed economies, institutional theory is preeminent in explaining impacts on enterprise strategies. For instance, Loveridge (2006) explains how political governments built upon their existing relationships with strong family business groups to fill institutional voids in return for supportive protectionist policies to achieve import substitution and export led growth. However as markets mature, transaction

cost economics and, subsequently, the resource-based view become more important in explaining impacts on enterprise strategies. Hence, the assumption that findings from Western or developed contexts are applicable worldwide to entrepreneurs fails to explain how entrepreneurs in conditions of institutional or resource constraints (as viewed through the Western lens) or in conditions of institutional complexities as in Mair, Marti, and Ventresca (2012), are able to develop ventures and sometimes even scale. There exist several examples of social entrepreneurship in emerging and developing countries (c.f. Desa 2011) which suggest that start up ventures can survive despite the lack of institutional support (Bornstein 2004; Bornstein and David 2010; Desa & Kotha 2005; Sarasvathy 2006; Mair & Martí 2009). If more attention is paid to entrepreneurial approaches in constraints, we may be able to in turn better inform research in the more mainstream innovation and entrepreneurship domains (Desa 2011; Ahlstrom 2010; Ahlstrom, Chen, & Yeh 2010).

In light of mainstream innovation and entrepreneurship literature, institutional theory also informs how organizations get access to resources (Aldrich 2003; Scott 2001). Prahalad (2005) alludes to both institutional concerns as well as resource scarcity for the process of innovating for the base of the pyramid, a market segment many social entrepreneurs seek to address. [4] Efforts for resource mobilization can be facilitated by mechanisms (Desa 2011) of legitimation (Suchman 1995), control (Pfeffer & Salancik 1978), connections and negotiation (Begley, Khatri, & Tsang 2010; Peng, Wang, & Jiang 2008) and inspiration and ceremony (Meyer 1983). Mair and Marti (2007) conceptualize social entrepreneurship as a parallel process of resource and institutional bricolage. Bricolage, sometimes referred to as making do to make the most of resources on hand (Baker & Nelson 2005; Mair and Marti 2007), serves

[4] The base of the pyramid is presented as a large consumer segment that poses challenge for multinational corporations (Prahalad 2005), entrepreneurs (London and Hart 2004), and governments (Sachs 2006) to provide affordable solutions that help mitigate poverty and its consequences. Prahalad encourages reducing dependence on resource as well as rethink infrastructure comprising broader architecture of systems.

as a mechanism through which social entrepreneurs can develop an organizational resilience to deal with institutional constraints and be able to address a social need (Desa 2011).

Both entrepreneurship and institutional scholars have described opportunity creation as a process of 'making do' by recombining elements on hand (Mair and Marti 2007). Entrepreneurship scholars believe that entrepreneurs create new opportunities through the recombination and transformation of resources that already exist (Baker and Nelson 2005). Some scholars have looked at weak, uncertain and emergent institutional environments to be conducive to bricolage activity (Desa 2009). Later work by Desa (2011) empirically tested the relationship between institutional theory (Hitt, Ahlstrom, Dacin, Levitas, & Svobodina 2004; Scott 2001; Thornton & Ocasio 2008) and resource mobilization for social entrepreneurship. Here Desa conceptualizes institutions as resource gatekeepers and bricolage as a form of resource mobilization. Institutional scholars believe that when confronted with no resources, entrepreneurs can use institutions that already exist in unintended ways to create new institutions and resources (Campbell 2004; Lanzara 1998; Stark 1996). For instance, Lanzara (1998, p.28) writes that "institution building often occurs not on the ruins but with the ruins of the old regime, as available resources are deployed to respond to emerging practical dilemmas". Mair and Marti (2007) try to bridge these schools of thoughts by referring to this sort of bricolage as making do with *both* resources and institutions at hand.

Based on structure-agency theory (Giddens 1984), both the social enterprise as agent and the institutional environment as structure can have recursive effects on one another (Barley & Tolbert 1997; Thornton & Ocasio 2008). In the process of accessing resources from the institutional environment, social enterprises may also enact institutional change (Campbell 2004). Consequently, Mair and Marti draw upon the entrepreneurship and institutional schools of thought to suggest that both resource and institutional improvisation

are carried out by social entrepreneurs. For those entrepreneurs who focus solely on resources, may find that the social structure impedes access or use of these resources by the target group. And those entrepreneurs, who focus solely on institution building, may find the process challenging should they not be able to mobilize necessary resources. [5] (I later find in chapter 5 that social entrepreneurs focus on resources while investors on institutional concerns.)

This takes us to the next section, i.e. of resource constraints. Social entrepreneurs confront severe resource constraints when trying to fulfil needs not fulfilled or even recognized by existing institutions (Desa 2011). However, in spite of this challenge of resource constraints, case studies suggest that social enterprises still survive and perhaps even thrive in penurious environments (Desa 2011; Kodithuwakku & Rosa 2002; West, Bamford, & Marsden 2008).

2.6 Resource constraints and scarcity

Resources are crucial in the development of a new venture (Pfeffer & Salancik 1978, Penrose 1959). For instance, these are needed for the acquisition and recombination into a product or service (Wernerfelt 1984, Shane 2003). Resource scarcity theory first mainly arose in the franchising literature (Tracey and Jarvis 2007) which posits that firms' motivation to franchise stems from a shortage of the resources required for expansion (Oxenfeld and Kelly 1969). A firm's innovative ability depends on being able to access tangible resources but also manage partnerships and firm knowledge flows (Tracey and Jarvis 2007). I will be widely referring to resource constraints, but interchangeably will refer to resource scarcity to mean

[5] Intuitively, social entrepreneurs may be more concerned about institutions, perhaps specifically because of the lack of institutions, than are commercial entrepreneurs who otherwise expect efficient market institutions to be widely available.

either the shortage of resources in the environment available to firms and consumers. An environment is resource constrained if it provides new challenges, whether opportunities or problems without providing additional or new resources (Baker and Nelson 2005).

As discussed in the preceding section, institutional constraints that hinder market exchange such as lack of property rights or specialist intermediaries are prevalent in poor or emerging economies (North 1990; Peng 2003). On top of institutional voids such as the capacity of many governments to deal with the number of issues it can pursue, Stiglitz (2001) and Sachs (2005) allude to severe resource constraints in the contextual environment, such as those in poor countries given the penurious nature of basic facilities such as infrastructure, literacy, access to literacy, medical care, retail chains, communication networks, transportation, housing, and sanitation. But Stiglitz (2001) posits that all societies are resource-constrained and poor countries even more so. (I later find in chapter 5 social entrepreneurs manipulate institutions in order to acquire necessary resources, i.e. concerns for institutions and resources overlap.)

These environments can't be considered as natural arenas in which traditional entrepreneurs and companies compete (Seelos and Mair 2007). Yet, the absence of many important products and services in poor countries requires companies to build new markets (Seelos and Mair 2007). The recent global financial uncertainty calls for the interests of businesses and societies to converge on addressing economic and social ills such as poverty. For instance, many South Asian firms do not just look at the scarcities and deprivations of the BOP, but also acknowledge the resources and capabilities of the BOP which can be harnessed through partnerships (Nakata 2012; Bhatti, Khilji, and Basu 2013). Partnerships help acquire resources for both commercial and social enterprises (Porter and Kramer 2002; Preston and Donaldson 1999). And even BOP research has emphasized the role of partnerships (London and Hart 2004) in dealing with resource scarcity (Seelos and Mair 2007). In this effort, new

product development and innovation offer a hopeful path forward (Nakata 2012). Gundry et al (2009) argues that the act of innovating through social entrepreneurship for social impact relies on creatively using resources at hand (bricolage) and on a set of institutional and structural supports which may facilitate or impede innovation (innovation ecology).

For this study of innovation as viewed by social entrepreneurs, the procurement, control and combination of labor, skills, and material is crucial to the creation of new products and services (Schumpeter 1934; Shane & Venkatraman 2000). Resources and associated limitations and resourcefulness are central concepts in the study of entrepreneurship (DiDomenico, Haugh, and Tracey 2010). Resources are varied but largely include i) technology in the form of machinery, hardware and software, ii) labor in the form of employees, contractors, volunteers, or friends and family), and iii) skills in the form of knowledge to institute efficient processes or new technologies (Desa 2009). Three management theories explain access to and utilization of resources for innovation – resource dependence theory, resource based view, and bricolage.

2.6.1 Resource dependence theory

Despite a period of waning, Davis and Cobb (2010) cite evidence that interest in resource dependence theory (RDT) is on the rise. They explain this rise on the similar status of current global affairs with those that were present in the period in which Jeffrey Pfeffer conceptualized the RDT: Economic crisis, social activism, and dissatisfaction with political leadership -- all of which according to David and Cobb, make core issues in RDT of power and dependency more salient. In fact, they claim that now is an opportune time for revitalizing resource dependence theory for a different economy.

Under the resource dependence theory (Pfeffer and Salancik 1978), resource scarcity is a dimension of the environment where objective resource constraints exist (Desa 2008). That is, resources are objective in the sense of being defined independent of the organizations that are embedded in that resource environment. Hessels and Terjesen (2010) explain that a major principle of resource dependency theory is resource scarcity since multiple organizations compete for the same or similar set of what are scarce resources. While it is assumed that firms have to have the resources needed, but literature also tells us that firms often start and survive despite resource constraints (Mahoney & Michael 2005, Kodithuwakku and Rosa 2002).

On the one hand, based on resource-dependence theory a lack of resources or resource constraints can hinder a firm's ability to grow (Desa 2009). This is because according to the theory firms acquire resources from the environment and firms' performance and growth is dependent on those resources available in the environment. The assumption here is that all firms perceive and elicit the same benefits and services from the same resources. This is why entrepreneurship researchers have largely assumed that the environment has resources to provide to the venture. Therefore, literature has focused on how to improve resource seeking to improve the probability of success (Aldrich 1999; Shane 2003). Apart from a few authors (cf. Kodithuwakku & Rosa 2002 and Starr & MacMillan 1990), most have neglected how ventures operate in penurious environments where they have little access to resources. But resource dependence theory suggests that in penurious environments, whatever resources are available are judged as useless or substandard and are therefore available cheaply or even freely without accruing benefit to firms.

On the other hand, based on resource-based view or theory, a lack of resources or resource constraints means that firms can still develop and grow. This is because firms respond differently to the same set of resources in the environment and get different services

from the same set of resources (Penrose 1959; Wernerfelt 1984). The assumption here is that a resource that may seem worthless to one firm can in fact be deemed to be rather valuable by another firm.

2.6.2 Resource based view

The Resource Based View (RBV) of the firm helps to explain how organizations develop and maintain competitive advantage using firm-specific resources and capabilities (Penrose 1959; Wernerfelt 1984). Under the resource based view theory, firms are unique in their embeddedness to a resource environment and make up peculiar resources, material, labor, and skills, from objective resources available in that environment. While one resource may be worthless to one firm, it may be viewed as valuable to another. The theory sheds light on why certain firms grow and others don't within the same environmental context.

In RBV a firm is a collection of resources (Penrose 1959; Wernerfelt 1984) which are used as inputs to produce outputs for value creation and sustainable competitive advantage (Barney 1991; Grant 1991; Peteraf 1993). Barney posits that resources "enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness" (1991, p. 101). Each firm combines resources in different ways that help to differentiate its capabilities from other firms (Peteraf 1993). RBV takes into account both tangible and intangible resources (Tracey and Jarvis 2007). Barney and Arikan (2001, p 138) define resources as the "tangible and intangible assets firms use to conceive of and implement their strategies." Barney (1991) explains tangible resources include financial, physical, human capital, and organizational resources:

> *"Physical capital resources include the physical technology used in a firm, a firm's plan and equipment, its geographic location, and its access to raw materials. Human*

> *capital resources include the training, experience, judgment, intelligence, relationships and insight of individual managers and workers in a firm. Organizational capital resources include a firm's formal reporting structure, its formal and informal planning, controlling, and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment" (p. 101).*

Intangible resources are explained as (Tracey and Jarvis 2007) comprised of organizational styles, values, and leadership (Grant 1991) as well as intellectual property rights, contracts, reputation, trade secrets, knowledge, and culture (Hall 1992).

Theories based on Resource Based View of the firm are grounded in mature and competitive environments (Seelos and Mair 2007). According to RBV firms can make profits by either acquiring resources at below cost of their financial worth or by converting resources into capabilities that benefit customers but also allow firms to capture value from those capabilities (Makadok 2001; Sirmon, Hitt, & Ireland 2007). But in markets that face large-scale poverty, the environment is very different (Seelos and Mair 2007) since resources from capital markets, product markets, and labor markets are scarce but also are mainly controlled by a few large organizations (Khanna & Palepu 1997).

The RBV focuses on the firm as the level of analysis and its resources as the unit of analysis. While an organization either owns or accesses assets or inputs to the production process (Helfat and Peteraf 2003), capabilities involve the capacity or ability to use these resources to achieve organizational goals (Helfat and Lieberman 2002). Moreover, dynamic capabilities are presented as explanations for understanding what makes firms effective at the development of new products (Teece, Pisano, and Shuen 1997; Rindova and Kotha 2001).

As in previous work by Tracey and Jarvis (2007), this work studies social entrepreneurship through a Resource Based View perspective and as mainstream entrepreneurship literature, supports the understanding that social entrepreneurs rely on

resources for value-creation. The RBV is useful to understand social enterprises since RBV focuses on inputs and resources, and not just on performance output characteristics and social enterprises in the context of the RBV are viewed as competitive organizations which combine and convert acquired resources to create social value (Tracey and Jarvis 2007). Unlike previous work, this study simultaneously uses the institutional theory perspective in studying social entrepreneurship and posits that resources alone are not sufficient for value-creation.[6]

2.6.3 Bricolage

While the former two theories offer insights on value appropriation, bricolage offers insights on value creation (Desa 2008). Entrepreneurship scholars have analyzed reactions to resource scarcity through the concept of bricolage (Baker & Nelson 2005; Garud & Karnoe 2003; Johannisson & Olaison 2007). Bricolage is frequently solicited to explain how firms may make use of resources where others do not, i.e. how firms "construct something from nothing" (Baker & Nelson 2005). According to pioneer scholar of bricolage, Lévi-Strauss (1967, p. 17), bricolage refers to the process of "making do with what is at hand". Baker and Nelson define bricolage as "making do by applying combinations of resources already at hand to new problems and opportunities" (2005, p.33). According to Baker and Nelson, in the original bricolage conceptual framework of Levi Strauss, firms make do and use combinations of resources for new purposes than those the resources on hand were meant for

[6] There have been efforts to merge RBV with Contingency theory, the latter arguing that firms which are able to align internal organizational variables with external variables will perform better than counterparts (Woodward 1958; Thompson 1967; Lawrence & Lorsch 1967a). Brush and Artz (1999) used the term "contingent resource-based theory" as they found the resource-based view was insensitive to the firm's context. They therefore, merged the contingency theory argument into resource-based view to offer that the value of firm resources is influenced by the environment.

in the first place. However, Levi-Strauss (1967) uses bricolage to also mean combining local cultures in new ways even though the term has evolved to largely embrace material changes. With the growing interest in social entrepreneurial behaviour, I will outline later how some scholars are introducing the social aspect of bricolage to acknowledge the importance of sensitivity and syncretism in handling local cultures, customs, and institutions. Bricolage can be used in two ways by entrepreneurs. One, it could be used as a mechanism that enables the entrepreneur to identify an opportunity and second, it could be used as a mechanism that enables the entrepreneur to enact the opportunity.

What is particularly relevant to this study is that entrepreneurs use bricolage in penurious environments (Baker & Nelson 2003).[7] Baker and Nelson 2005 studied 29 resource-constrained entrepreneurial firms and cited bricolage as a process by which these firms create services. Further, Baker, Miner & Eesley (2003) and Baker & Nelson (2005) suggest bricolage often occurs in the absence of institutional support with particular emphasis on entrepreneurs as actors (Chao 1999; Lanzara 1998; Stark 1996). Resource constraints can result in innovative ways to use existing resources and to acquire new resources (DiDomenico et al 2010). Some ways by which commercial entrepreneurs manage resources in resource-poor environments include the use of networks (Starr & MacMillan 1990; Peterson 1995), bootstrapping (Harrison, Mason, & Girling 2004; Godin 1998), effectuation (Sarasvathy 2001), and bricolage (Levi-Straus 1967). Although both commercial and social entrepreneurs operate under varying conditions of resource scarcity, social entrepreneurs particularly have to function under extreme versions of this scarcity. Commercial entrepreneurs generally target markets that have capacity to support growth and expansion while social entrepreneurs purposely target markets that are characterized by few

[7] But not limited to entrepreneurs -- for instance, Halme et al's (2012) work on large MNCs shows how intrapreneurial bricolage can help achieve innovation for inclusive business.

resources and function poorly (DiDomenico et al 2010). Social entrepreneurship offers further opportunity to investigate resource scarcity or resource constraints (DiDomenico et al 2010) and institutional pressures (Douglas 1986) such as weaknesses in the macro structural environment. The environment in turn is one in which the constraints of institutional rules and structures force social entrepreneurs to use and exchange resources dynamically and help them to put together their own bundle of resources and repertoire of strategies and activities, for instance through bricolage (DiDomenico et al 2010).

Bricolage has economic and social domains which means it may be especially suited to understanding processes of resource acquisition in social enterprises that have both commercial and social value under conditions of resource scarcity. Bricolage can help in opportunity recognition to see the unused potential value in resources and thereby can help to lower costs, reduce the risks in financial expenditure, and increase return on assets (DiDomenico et al 2010). And they, DiDomenico et al 2010, draw on theories of bricolage to explore empirically resource acquisition among social entrepreneurs. They find that the social entrepreneur acts as a social bricoleur who makes do and creates something from nothing while continually adapting and responding to the environment. And within this environment they acknowledge that although social enterprises can be found in many diverse contexts, they explain that they are most likely found in communities characterized by limited access to resources (Peredo & McLean 2006) as well as in communities facing lack of public facilities and services (Porter 1995).

The first construct of bricolage as ‘making do’ or recombination into novel ways is found in several accounts of social entrepreneurship (Zahra, Gedajlovich, Neubaum, & Shulman 2009). This recombination of resources in bricolage is akin (DiDomenico et al 2010) to Penrose’s (1995) notion of the idiosyncratic uses of resources. Baker, Miner, and Eesley (2003, p. 256) invoke bricolage as “a construct frequently used to describe the

resource set invoked by improvisation." The second construct of bricolage is a 'refusal to enact limitations' (Baker and Nelson 2005) which helps to counteract conventional limitations imposed by institutional or political settings and the available resource environment (DiDomenico et al 2010). The third construct of bricolage follows on from the previous one as 'improvisation' or adaptation of working and creative thinking in order to counteract environmental limitations (Miner et al. 2001; Weick 1993). This third construct is widely evidenced in accounts of social entrepreneurship (DiDomenico et al 2010).

For purposes of this dissertation, the concept of bricolage as an enactment of opportunity is especially important as it pertains to social entrepreneurship for two main reasons (Desa 2009). First, social entrepreneurs often face severe resource constraints because access to philanthropic and capital markets is limited given the difficult contexts and circumstances in which they try to address social problems. For instance, social entrepreneurship is found in resource-constrained environments, from the typical vision of poverty stricken villages in India and Brazil (Bornstein 2003) to low income neighborhoods in the United States (Porter 1995). Second, social entrepreneurs try to do so in institutional contexts and circumstances that are not addressed or recognized by existing public or private institutions, i.e. they function in institutional voids (Desa 2009).

From the above outline of research in bricolage, we see it has helped to explain how entrepreneurs in general find and tap opportunities and resources. But with growing interest in how social entrepreneurs enact bricolage, I have shown how there have been attempts to introduce the social aspect of bricolage leading to idiosyncratic version of it, one you may call social bricolage (from social bricoleur). Such efforts have reintroduced the notion of improvising across and within cultures (Levi-Straus 1967) and brings forth the recognition that identification of, access to, and use of resources through bricolage takes place within larger institutional contexts.

2.6.4 Summary of resource constraints literature

In moving ahead, the theoretical takeaway is that resource dependency theory and institutional theory link the firm to the macro environment (Lewin, Weigelt and Emery 2004) while resource based view and bricolage theories acknowledge the availability of resources the firm to larger institutional settings (Seelos and Mair 2007; Levi-Strauss 1967). Whether bricolage is about making do, refusal to enact limitations, or improvisation to counteract environmental limitations, it takes place within or even because of larger institutional settings that affect identification of, access to, or use of resources within that environment (DiDomenica et al 2010). A major tenet of resource dependency theory is resource scarcity where multiple organizations compete for the same or similar sets of scarce resources (Hessels and Terjesen 2010). The resource based view instead focuses on the firm's use of the resources available to it and consequently focuses on the firm rather than the macro environment (Lewin et al. 2004). Oliver (1997) argues that institutional theory plays an important role in understanding the context and process by which firms make resource choices. Bloodgood (2000), in line with Oliver's (1997) suggestion, integrates institutional theory and the resource-based view of the firm to better understand the context and process of how and when a firm selects resources. In the next section I summarize how I identify an unexplored area in the literature which draws on innovation studies having dichotomously considered institutional voids and resource constraints separately. Instead we have seen that the social entrepreneurship literature suggests that both types of constraints impact innovation efforts by social entrepreneurs. This provides an opportunity to simultaneously use and merge theories of resources and theories of institutions to better understand how innovation is perceived by social entrepreneurs (and in future research how innovation is practiced).

2.7 Research opportunity: Merging innovation & social entrepreneurship under constraints

The preceding literature review refers to two main literature streams: Innovation Studies and Social Entrepreneurship. This review has helped identify an unexplored area of the literature (figure 1.1) to advance theoretical models of innovation (see for example Guillén 1994; Marinova 2001; Sarasvathy 2001; and Mair, Battilana, & Cardenas 2013) by bridging the literatures on innovation and social entrepreneurship through common concerns of institutional voids within institutional theory and of resource scarcity within resource dependency theory, resource based view and bricolage.[8]

I find that the innovation literature (stream 1) looks at innovation under constraints either under institutional voids or resource scarcity. Few if any studies on innovation have combined the challenge of functioning under both simultaneous constraints of institutional voids and resource scarcity. But the social entrepreneurship literature (stream 2), argues that social entrepreneurs have to function and innovate in conditions marked by both institutional voids and resource scarcity. The markets in which social entrepreneurs function can be considered extreme environments given the penurious nature of basic facilities such as infrastructure, access to education, medical care, retail chains, communication networks, transportation, housing, and sanitation. So this study seeks to advance models and theory of innovation by bridging the literatures on innovation with social entrepreneurship and institutions and resources, specifically the lack thereof.

I cite now literature which supports my proposal to bridge the aforementioned literature streams and theories. Over the last 30 years or so, research using RDT has enjoyed

[8] In "Models of Management" Guillén (1994) outlines historical patterns in the adoption of the three major models of organizational management: scientific management, human relations, and structural analysis.

integration with several theoretical perspectives (cf. Hillman, Withers, and Collins 2009). But there is still potential to integrate RDT with other neglected theoretical perspectives. Hillman et al (2009, p.1418) write:

> *"The interaction of interdependent organizations and their environment is a dynamic, complex process requiring robust perspectives that can explain a broad range of outcomes. Thus, integrating RDT with other complementary perspectives may offer a more realistic perspective of this interaction."*

The idea of merging resource and institutional based theories is not new, though still not very popular (Hillman et al 2009). It is possible to merge the two since resource dependency theory and institutional theory are similar in that both are concerned with the relationship between an organization and a set of actors in the environment (Hessels and Terjesen 2010). In both theories multiple external pressures constrain organization choice and in both organizations seek to gain legitimacy and acceptance through and by external stakeholders. The benefit is that the two theories have greater predictive power when used together (Sherer and Lee 2002).

For instance, citing institutional change and innovation in large law firms, Sherer and Lee (2002) integrate resource dependency and institutional theory to argue that resource scarcity drives, and legitimacy enables, institutional change. They look at resource constraints as a driver of innovation. They explain that RDT suggests that "organizations facing resource scarcities will seek to be more competitive in acquiring resources or to innovate in ways that allow them to make use of alternative resources." (p. 103) However they then draw from institutional theory to explain how the change is instituted rather than any notion of institutional voids. They continue to say, "It is here that institutional theory provides an important contribution. Through its notion of legitimacy, institutional theory helps to identify which organizations are most apt to be initial innovators and early adopters." (p.103)

Nevertheless, this early article merges resource dependency theory with institutional theory in a meaningful way to explain complex phenomenon, something this study also strives to do.

For our purposes, integrating RDT with the resource based view (RBV) of the firm (Barney 1986; 1991) and with institutional theory (DiMaggio and Powell 1983; Meyer and Rowan 1977) may be particularly enlightening and productive (Hillman et al 2009). Both RDT and RBV have a complementary focus on resources, and integrating these two theories can enable a consideration of both an externally focused perspective of how organizations obtain valuable resources (RDT) and an internally focused perspective of how organizations specify resource needs as well as how they integrate resources for idiosyncratic uses in order to gain competitive advantage. In relation to integrating RDT and institutional theory, we can gain greater insights on how institutional forces influence what form of resource dependency reducing strategies firms use as well as how firms' efforts at shaping or circumventing institutional constraints influences how resources are sourced and used. And although RDT and contingency theory share a number of fundamental assumptions on the role of environmental uncertainty, yet these synergies have not been capitalized upon (Hillman et al 2009; for exception see Dess and Beard 1984).

In moving ahead, I use the terms resource scarcity and resource constraints interchangeably to connote both the low level of resources available to social entrepreneurs as well as the low level of purchasing power of downstream customers. Similarly, I use the terms institutional voids and institutional complexities interchangeably to connote both the lack of institutions deemed necessary for the market to function and also the acknowledgement that if these do not exist, then there are other institutions in place, whether supportive or detrimental to the operation of the market.

2.7.1 Innovation under constraints

A search of the literature shows there are few scholarly papers on innovation under institutional voids or resource constraints, let alone both constraints simultaneously. For instance, a search on databases Business Source Complete and Proquest revealed only two peer-reviewed papers using the search criteria [innovation AND ("institutional void" OR "institutional voids")]. Both papers reveal no empirical insight on innovation under these conditions. A similar search through both databases using the search criteria [innovation AND ("resource scarcity" OR "resource scarce" OR "resource constrain" OR "resource constrains" OR "resource constraint" OR "resource constraints" OR "resource constrained")] revealed 48 and 227 results between the two databases. Many of these papers were in the field of environmental and development studies, but few if any were in organizational and management studies. Add the term social entrepreneur or social entrepreneurship in the preceding search criteria involving innovation and one of the two constraints and there are no results whatsoever.

Although resource-constrained start-ups and young firms do not have access to complex capabilities and investments to innovate (Aldrich 1999), nonetheless they often manage to engage in successful innovation (e.g. Arrow 1962). Generally, organizational studies have concentrated on the negative aspects of constraints in skills, time, and resources and focused on strategies to overcome these constraints (e.g. Agarwal, Sarkar, and Echambadi 2002; Rao and Drazin 2002). But another side of the resource constraints literature argues that fewer resources lead firms to more efficiently allocate resources (Starr and Macmillan 1990).

One of earliest works on innovation under resource constraints in organizational theory is by Nohria and Gulati (1996) which argues that the relationship between

organizational slack and innovation is curvilinear—too little slack is as bad for innovation as is too much slack. Rao and Drazin (2002) examine how firms can overcome resource constraints on product innovation. But they focus on human resource constraints which are internal to the firm. They identify firms with resource constraints as those which are young or poorly connected: "We suggest that both young firms and poorly connected firms face resource constraints and are unable to grow through product innovation." (p.492) Nevertheless they find that these (human) resource constrained firms have lower rates of product innovation than their advantaged counterparts and therefore tend to recruit more from rivals to surmount these human resource constraints. Citing literature that claims financial resource slack supports creativity and innovation (Amabile 1988; 1996; Camison-Zornoza et al. 2004; Damanpour 1991; Gassmann and von Zedtwitz 2003), Hoegl, Gibbert, and Mazursky (2008) study under what conditions, financial resource constraints enable, rather than inhibit, the performance of innovation teams. They find support for new product development literature which has shown that resource-constrained projects can help create innovative products that are also successful in the marketplace (Goldenberg, Lehmann, and Mazursky 2001; Moreau and Dahl 2005). Closer to this work's focus on innovation, Weiss et al 2011 provide evidence that even disruptive innovation outcomes can be achieved with constrained financial resources. This is, under certain conditions, supported by hypotheses testing on a sample of 94 innovation project teams from a variety of industries (Weiss et al 2011). Senyard, Baker, and Davidsson (2011) find that bricolage is an important pathway to innovation for such resource-constrained firms. In another study, Paanenen (2012) shows that firms under resource constraints tend to use external sources of knowledge in their search activities for innovation rather than internal ones while firms that are constrained by finance tend to search both internally and externally.

Consequently, most researchers have looked at the effect of financial resource constraints on innovation team performance (c.f. Rao and Drazin 2002; Weiss et al 2011; Paananen 2012). This suggests that there is potential to meta theorize and study resources beyond just financial resources as well as to move the level of analysis from teams to firms. It may be that firms have to be in an independent position to tolerate constraints from the external environment before earmarking such challenging projects to their internal teams. In some way, firms have to absorb the potential risk as well as to shield teams and provide teams with a supporting environment that fosters constrained challenges.

Katila and Shane (2005) use the contingent resource based perspective to explain innovation in new firms which are resource constrained. Katila and Shane's (2005) study outlines empirical evidence that resource constraints may in fact be positive and enabling. In seeking to answer the question prevalent among organizational researchers whether firm newness hinders or facilitates innovation, they demonstrate that innovativeness depends on environmental characteristics. In particular they find that new firms are more likely to reach first sale and are less prone to abandon efforts to innovate even when confronted with more competitive, smaller, and less manufacturing intensive markets. They further address the question of under what environmental conditions does a lack of resources become useful and when it is constraining. They find that resource constraints in certain environmental conditions can be enabling, which is very relevant for this study. Their study tested how different types of environments changed the value of organizational resources. They provide evidence for the popular assumption in the dynamic capabilities (Teece et al. 1997) literature that it is important for firms to reconfigure resources as environments change. They corroborate Brush and Artz' proposition (1999) that the value of resources depends on the environment. Moreover, as the performance of new firms depends on their respective environments, Katila and Shane (2005) suggest that the environmental context in which new

firms operate should be included in theories of entrepreneurship. For instance, in poor countries, the value of meager and scarce resources as dependent on the environment may help to explain the value of low cost inputs to the innovation process for many social entrepreneurs.

For this study in particular, Katila and Shane's work signals the importance of considering not only the contingency based response of firms to a changing environment, but also the actual nature of the environment in which firms seek to innovate and grow. One way we can incorporate the environmental context in theories of entrepreneurship as they recommend, but also in theories or models of innovation, is to draw from institutional theory, something the innovation literature stream has not adequately done thus far.

Similar to Desa (2008) who finds scant literature on whether entrepreneurship in resource constrained environments is different from conventional business entrepreneurship, I find there is little or no literature on whether innovation in resource constrained environments is different from mainstream innovation. Furthermore there was superficial acknowledgement in the development literature of the double edged problem of institutional voids and resource scarcity, but few if any work on how innovation takes place within both simultaneous challenges. This is surprising given the intuitiveness of both constraints occurring at the same time and of the opportunity this promises to innovation scholars to study interesting and "extreme" contexts.

By using a combination of resource related and institutional theories we can go a further step and link innovation activities of the firm to the institutional environment and to the resources available therein. But as covered earlier, if we wish to study innovation under both institutional voids and resource scarcity, then an ideal starting point would be that

offered by the field of social entrepreneurship, which is deemed in the literature to occur in contexts marked by both institutional voids and resource scarcity.

2.7.2 Social entrepreneurship under constraints

The focus on social entrepreneurs is particularly interesting because social entrepreneurs face two double edged challenges. One, they function within a field where there is a lack of institutions and second lack of resources devoted to social enterprise and innovation (Mulgan 2007). Further, they have to innovate in environments where beneficiaries themselves reside in environments marked by institutional voids (Khanna and Palepu 1997; 2006) and do not have adequate resources (Prahalad 2005). However there is no work on how innovation is understood by social entrepreneurs who operate under both institutional voids and resource scarcity.

Dart (2004) find that social entrepreneurs frame goals around resource scarcity which are congruent with their nonprofit or prosocial values. Some social entrepreneurs see resource constraints as an opportunity rather than a constraint – Dart quote one of their respondents as saying: "Resource constraint is something that we wouldn't talk about. It is almost an invitation to slack off. It's an invitation to say, 'It's the government's fault.' Negative stuff. We don't have resource constraints, we have resources. What's the best use of the resources we've got? We know in our heart of hearts that we haven't got [enough] money . . . but that's irrelevant." (p.301)

Social and commercial entrepreneurship are similar in many ways such as the necessity to bear uncertainty and invest resources for the venture creation process (Estrin et al 2011; c.f. Dacin et al. 2010; McMullen & Shepherd 2006, Meyskens et al 2010; Reynolds

2011; Shane 2003). However social entrepreneurs appear to use resources more efficiently through processes such as bootstrapping, bricolage and building partnerships (e.g. Corner & Ho 2010; DiDomenico et al. 2010; Mair & Marti 2009). They also rely more on informal relationship-based exchange for knowledge, contacts and resources than on employment (Estrin et al 2011).

Estrin et al (2011) provide a more differentiated view of institutional voids on social entrepreneurship. On the one hand they find support for the institutional void perspective that demand for social entrepreneurship may be enhanced by weak institutions. On the other hand they find that social entrepreneurship thrives in countries with strong institutional quality – a notion somewhat inconsistent with most institutional void perspectives. This suggests that although demand increases, the supply may not equally materialise.

Despite all that has been researched and published about social entrepreneurs and their relationship with innovation, we don't know how social entrepreneurs talk about innovation. We even don't know much about social innovation something we attribute to social entrepreneurs (c.f. Phills et al 2008; Pol and Ville 2009; Minks 2011). It is worthy to study not only what they do but how they talk about it. So the vocabularies they use and generate reveal insights on what they think about innovation.

Moreover, there is little work on how innovation is understood by social entrepreneurs who operate under both institutional voids and resource scarcity. Current studies have been unable to reconcile these challenges by analyzing entrepreneurial or large firm strategies. The closest paper that looks at both challenges is by Mair and Marti (2009) which shows how a specific case of social entrepreneurship acquires resources and employs bricolage to put them to use. The study design is limited in two ways. One, it involves a single unique case of social entrepreneurship with future research potential to extrapolate

analysis to several social entrepreneurs. Second, it focuses on entrepreneurship activities without differentiating aspects of innovation.

In other work Liu, Woywode, and Xing (2012) analyze how formal and informal institutions interact and their role in promoting innovation in high technology Chinese start-ups. In previous work, Liu (2011) investigates the influence of institutional voids on innovation in high technology ventures and argues that institutional voids might offer firms the opportunity to hone their skills in the face of global competition. While both cited studies involve innovation, neither looks at how social entrepreneurs innovate in the face of these contextual challenges or opportunities.

I hope the preceding section and others have adequately outlined the research opportunity that lies at the intersection of innovation studies and social entrepreneurship literatures, specifically in merging theories of institutional theory with resource theories as they relate to innovation and social entrepreneurship. This work does not seek to address how social entrepreneurs actually innovate. But an equally important concern this work tries to address is to understand how social entrepreneurs perceive and view innovation under constraints. I next describe the conceptual framework that incorporates much of the preceding theoretical streams to provide an analytical tool that can help analyze innovation as perceived by social entrepreneurs.

2.8 Conceptual framework

I have established the importance of understanding social entrepreneurship and innovation in the context of institutional voids and resource scarcity. Social entrepreneurs and innovators have to devise low cost strategies to either tap or circumvent institutional

voids and resource limitations to innovate, develop and deliver products and services to low income users with little purchasing power, often at mass scale (Bhatti et al 2013). The investigation of innovation as perceived by social entrepreneurs and within extreme contexts can be assisted by a conceptual theoretical framework that incorporates the different theoretical perspectives used to identify and justify the object of study.

A conceptual framework is a written or visual presentation that "explains either graphically, or in narrative form, the main things to be studied – the key factors, concepts or variables - and the presumed relationship among them" (Miles and Huberman 1994, p.18). I envisage a conceptual framework useful for this study keeping in mind the contingency perspective on the kind of environment where social entrepreneurs have to operate in: resource and institutional both upstream and downstream of their innovation activities. Additionally I use a value chain innovation perspective to analyze innovation inputs and outputs both upstream and downstream of the innovation process as encompassed under both institutional voids and resource scarcity.

I examine the perceptions of innovation among social entrepreneurs from a contingency perspective (Lawrence & Lorsch 1967; Woodward 1965) because of contingency theory's postulation that decision-making depends upon various internal and external constraints or situational factors.[9] Contingency theory is a foundational logic among management scholars that underpins many organization and strategic management theories. Its roots are based on Woodward (1965) and Lawrence and Lorsch (1967) who found from studying why different organizations had different organizational designs, that

[9] However, a word of caution here on the use of contingency theory and resource dependency theory: In the original cited works by Woordward and Lawrence and Lorsch, the contingencies and resources were objectively measurable qualities shared by all concerned. But given the nature of research questions focusing on perceptions of social entrepreneurs, these contingencies and resources are to be seen as 'perceived contingencies' and 'perceived resources' by my informants.

there may not be "one best way" to enhance managerial and organizational performance. For our purpose, it has underpinned institutional theories on design and change (cf. Greenwood et al 2008; Hargrave and Van de Ven 2006; Reay & Hinings 2009; Thornton, Ocasio & Lounsbury 2012). Through the contingent lens, I analyze the boundary conditions within which processes and structures of innovation among social entrepreneurs hold. My research seeks to understand not only the broader conceptualization of innovation, but specifically and mainly under the external constraints that social entrepreneurs face. The above outlined literature streams suggest two main external constraints social entrepreneurs face, one of resources and the other of institutional conditions.

Another tool useful for examining the perceptions of innovation among social entrepreneurs is to visualize the innovation process in terms of value chain. Value chain analysis has been used to study a range of innovation questions (c.f. Kaplinsky and Morris 2001; Hansen and Birkinshaw 2007; Roper, Du and Love 2008; Dedrick, Kraemer, and Linden 2010). Hansen and Birkinshaw (2007) recommend "To improve innovation, executives need to view the process of transforming ideas into commercial outputs as an integrated flow rather like Michael Porter's value chain for transforming raw materials into finished goods." (p.3). The innovation value chain is basically comprised of a recursive process of knowledge sourcing, transformation and exploitation (Roper et al 2008), thereby incorporating everything from inputs to outputs.

Value chain analysis is useful to identify mixed constraints which are either supply or demand driven, and occur either upstream or downstream of the value chain. Burg et al (2012) explore a new approach to reconcile the inconsistency in literature on how resource constraints affect opportunity identification by entrepreneurs. Previous studies show that resource constraints have mixed effects on innovation and opportunity identification by entrepreneurs. Sometimes, resource constraints lead to identifying more opportunities,

whereas in other cases, entrepreneurs see fewer opportunities. Burg et al make a distinction between supply and demand constraints and their relationship with supply and demand opportunities. Based on a quantitative study of 219 SMEs, they find that resource constraints direct the entrepreneur's attention toward opportunities inside the constrained domain rather than outside the constrained domain. What is specifically relevant for this study is that Burg et al's findings suggest that researchers should consider different types of resource constraints and different sources of opportunities simultaneously. I do so in this study by considering these mixed resource constraints which can pose either an opportunity or impediment to innovation.

Constraints can be faced by social entrepreneurs both upstream as well as downstream of the innovation process. Upstream, social entrepreneurs have to deal with institutional voids (Khanna and Palepu 1997) and complex institutional contexts (Mair, Marti and Ventresca 2012) as well as limited resources available as inputs to innovate. Downstream, social entrepreneurs have to create outputs to address the needs of the bottom of the pyramid i.e. the largest and poorest socio-economic segment of the population (Prahalad 2005) and have to find means to provide access to these outputs through various institutional structures and mechanisms. Resource scarcity also includes the inability of vast populations to afford the means to address not only wants but also needs (Seelos and Mair 2007). Some of these constraints might be viewed as threat, others as opportunities, depending on various environmental and behavioural factors.

In the "extreme resource constrained" contexts (Mair and Marti 2009) that social entrepreneurs often function in, resources may be scarce at all points of the value chain meaning that affordability is not just for the end market consumer but any firm wishing to employ another firm’s outcome as inputs to the process. The challenge for companies doing business, designing products and managing costs at the base of the pyramid market is that

customers are willing (London & Hart 2004; Prahalad 2004) but often not able to pay due to income constraints (Seelos and Mair 2007), which can be deemed as another form of resource constraint faced by service providers in these environments. I depict this as downstream resource constraints in the value chain framework. The unique social, cultural, and institutional characteristics of the BOP markets mean that traditional products, services, and management processes will not work for these BOP markets (Prahalad 2004). So affordability is not just a concern at the end point or outcome of innovation. Therefore I examine how resource constraints are faced both upstream and downstream for all users at any point of the value chain in conjunction with having to function within institutional complexities or voids.

DiMaggio and Powell (1983, 1991) developed institutional theory in the context of organizations and industries. Extending this to societal level, institutions are "the humanly devised constraints that structure human interaction" such as informal cultural norms as well as formal legal rules (North 1990, p.3). North's formal and informal institutions are classified by Scott (1995, 2008) into regulative, normative, and cultural-cognitive. The regulative pillar includes state enforced laws for society; the normative pillar includes roles and expectations described by professional societies for specific groups; and the cultural cognitive pillar includes generally accepted beliefs and values shared among individuals. I look at these types of institutions as largely "soft" institutions.

However what is missing in this institutional theory perspective is infrastructure, what I think of as the "hard" institutions that enable markets to function such as ports, roads, energy distribution, schools, and hospitals. For instance, Tongia and Subramanian (2006) cite both soft as well as hard institutions. They suggest that the developing world is particularly deficient in infrastructure as well as capital market mechanisms. They compare commercial ICT solutions in the United States to developing world; in the former there are available

infrastructure and market mechanisms while in the latter the same institutional facilities are few or non-existent. Additionally, Ray et al 2004 find that resources and capabilities like technical IT skills, knowledge and infrastructure flexibility can affect operational processes. But they view infrastructure from the RBV perspective of infrastructure held or controlled by the firm. Other tangible infrastructure such as ports, roads, and training universities are often not controlled by firms, rather provided as public infrastructure for the public good. For this reason, I include the institutional theory perspective to differentiate between hard infrastructure assets which are controlled by the firm based on the RBV lens from those hard infrastructure assets that are not controlled by the firm based on the institutional theory lens, but nevertheless are needed for efficient market operations.

Consequently, by using the contingency and value chain perspectives, I propose the following conceptual framework on innovation under both institutional voids and resource scarcity as shown in figure 2.3:

<See figure 2.3, page 73>

i) Upstream there is a lack of resources in capital, skills and labor available to social entrepreneurs;
ii) Downstream clients or customers who themselves are resource deficient and have low purchasing power;
iii) Upstream activities lie in environments where there are institutional (soft) complexities or voids with regards to contracts, rules, trust, and legitimacy, and;
iv) Downstream there is lack of (hard) institutional supply-chain and distribution infrastructure such as roads, ports, and transportation.

This use of value chain analysis as a conventional analytical tool well grounded in management practice may help to shift the practise of innovation by social entrepreneurs from ‘odd’ case to convention. Although the unit of observation is the entrepreneur, the unit of analysis is the value chain through which the social entrepreneur seeks to innovate. The above conceptual framework is only a starting point of this fairly extensive work which seeks

to build models of innovation by empirically revealing the perceptions and views of social entrepreneurs on innovation broadly as well us under dual constraints of institutional voids and resource scarcity.

Models as abstract conceptualizations are used widely to make sense of how things are or will be and have been used widely, such as in economic models, policy models, business models, geographic models and biological models. But lessons learnt from econometrics models suggest that pure reductionism does not do justice to the complexity and plurality of realities. And these risks remain in this effort to frame innovation models from the perspective of social entrepreneurs. I refrain from purely economic models and focus more on conceptual models of innovation to better understand and comprehend the diversity of perspectives social entrepreneurs bring to innovation.

2.9 Other emerging literature

The approach I've taken here is to discuss mainly those works that justify the research questions, conceptual framework and analytical approach in merging relevant theories. All other relevant works, such as frugal innovation (Basu, Banerjee, and Sweeney 2013), reverse innovation (Govindarajan and Trimble 2012), grassroots innovation (Gupta 1998), inclusive innovation (George, McGahan and Prabhu 2012), *jugaad* innovation (Radjou, Prabhu, and Ahuja 2012), I bring in as discussion that draws from revelation of these concepts as findings from social entrepreneurs. From the title, it follows that frugal innovation is a major tenet of this work, but I do not cover frugal innovation or other emerging concepts in this literature review chapter. Although interspersed in findings chapters 4 and 5, I extensively discuss literature on frugal and other emerging concepts as part of integrative discussion in chapter 6.

The findings to be revealed in empirical chapters 4, 5 and 6 will help to contribute to theoretical frameworks that go beyond the current notion of social innovation as often attributed to social entrepreneurs in the literature. In the integrative discussion of chapter 6 I will show how the different types of emerging concepts; frugal, reverse, grassroots, inclusive, and jugaad relate or fit in with the two models of innovation which I empirically find from this research. To get us started towards the empirical chapters that address the questions that emanate in this literature review, I next outline the research methodology.

Figure 2.1: Literature sections discussed and their interconnections

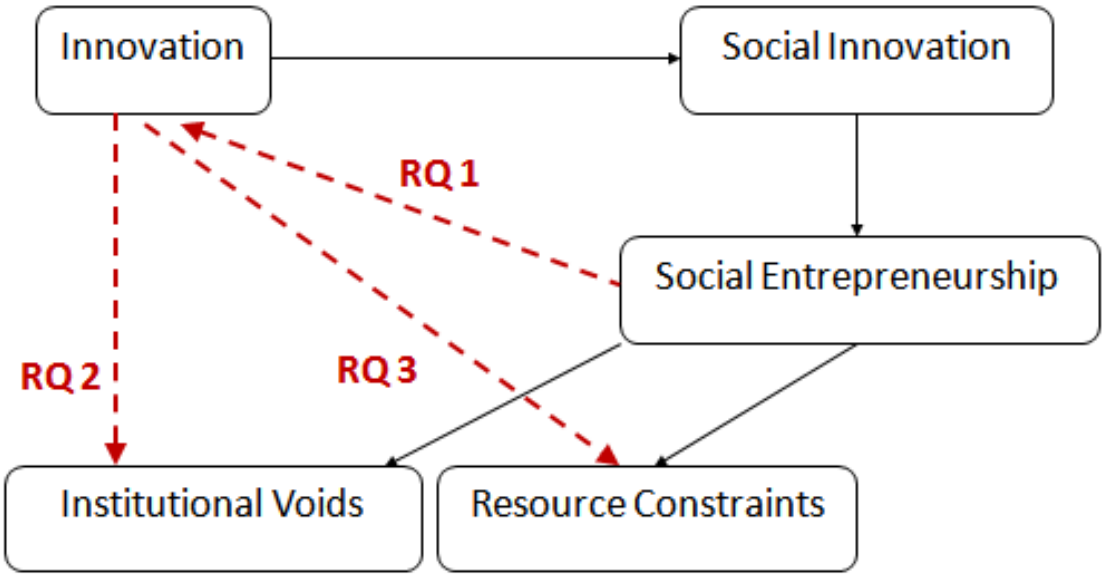


Figure 2.2: Snapshot of literature cited

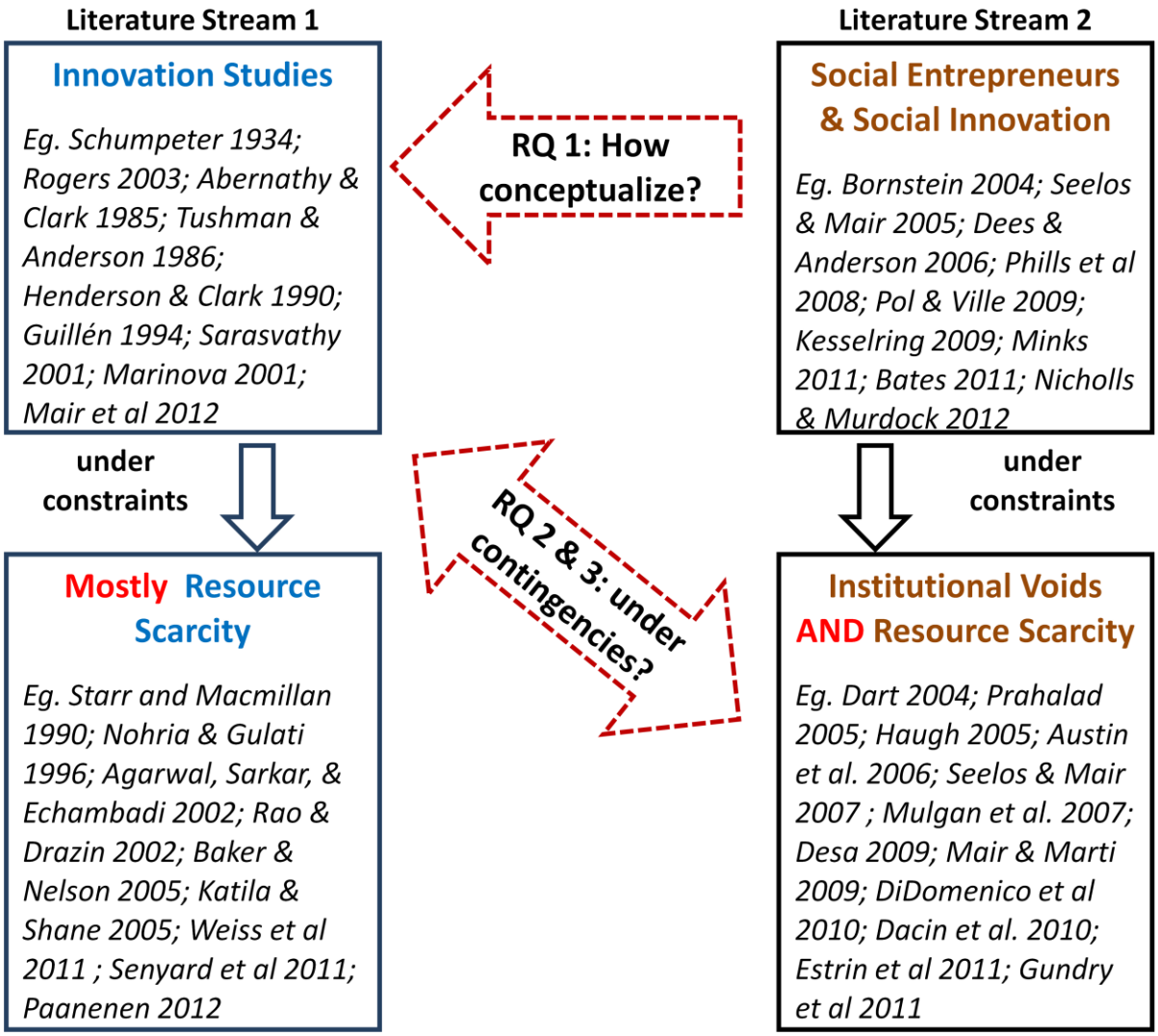
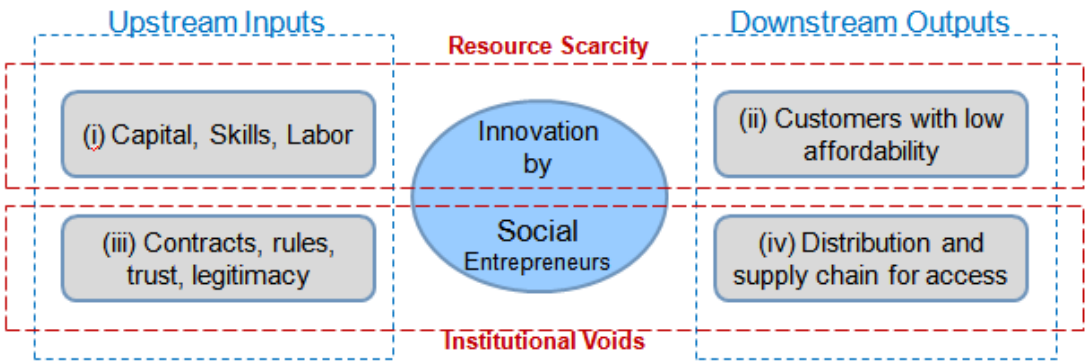


Figure 2.3: Conceptual framework



3 RESEARCH METHODOLOGY & DESIGN

3.1 Introduction

A review of the nature of research questions guides the choice of research methodology and methods (Bryman and Bell 2003; Creswell 2003; Punch 2005; O'Leary 2004; Maylor and Blackmon 2005; and others). However the researcher's assumptions of the nature of knowledge discovery or epistemology and the nature of reality or ontology, affect the type of answers the researcher eventually 'interprets' (Creswell 1998; Guba & Lincoln 1994). Social science questions therefore reveal different answers depending on both the nature of the questions and which paradigm the researcher is inclined to use to achieve his or her aims and objectives.

I outline first the questions, aims, and review the assumptions I make in approaching these questions. Then I layout the sources of data and the methods used in analyzing data set for each question. The research questions and key aims of each question are summarized in table 3.1 while a summary of the entire research design outlined in this chapter is depicted in table 3.7.

<See table 3.1, page 98>
<See table 3.7, page 102>

3.2 Research methodology

The above research questions could be approached by any of post-positivism, constructivist, interpretivist, or phenomenological approaches. The epistemological and ontological stance of the researcher is marked by the paradigm of post-positivism and specifically critical realism as outlined in table 3.2. In this post-positivist philosophy of

analysis whether it be qualitative or quantitative, I as the researcher am responsible for putting aside my biases and beliefs and seeing the world as it 'really' is (Trochim 2006). However, how well I can achieve this and assure this from my respondents, is unlikely to be perfectly unbiased and therefore prone to error. Post-positivists believe we can never be entirely objective, though we can try and achieve it. This is because our observations are affected by culture, worldviews, and theory-laden perspectives. Therefore the post-positivist relies on multiple measures and observations and uses these for triangulation across multiple error-prone sources (Trochim 2006). The benefit of using multiple methods and sources of data provides for convergence and triangulation of findings (Jick 1979) over several fallible sources. As assumed within the critical realism paradigm this achieves greater robustness of results.

<See table 3.2, page 98>

The appropriateness of employing a qualitative research methodology derives from the nature of the social phenomena (Morgan & Smircich 1980) on how social entrepreneurs talk about innovation. According to Cohen and Manion (1980, p.27), "the purpose of the social science is to understand social reality as different people see it and to demonstrate how their views shape the action which they take within that reality". The research objectives (table 3.1) solicit an in-depth, detailed exploratory study, delving into the perception of innovation among social entrepreneurs.

A concept is a general expression of a particular phenomenon and is used to impose a coherent meaning on the world. However among social entrepreneurs, this coherent meaning for 'innovation' is yet to be divulged empirically in the current literature. As a social scientist I recognize that the widely acclaimed but deep concept of innovation will be based on

opinions, values, traditions, cultures and rules that cannot, unlike in natural science, be precisely defined (Clarke 2005). I therefore focus on the talk around innovation by social entrepreneurs. To reveal and analyse this talk and thinking I use qualitative descriptive approach which entails the presentation of the facts of the case in everyday language (Sandelowski 2000). What this means though is that the orientations or logics displayed by informants are to be treated as socially constructed and not necessarily universally and materially 'objective'. Nevertheless descriptive research on management and strategy practices (for instance Whittington 1996) has used fieldwork, interviews, and observations to create models of understanding, theory generation and eventual paradigms. I therefore explore the phenomenon of innovation among social entrepreneurs to help reveal patterns of differences and similarities and broaden our understanding of theories. Consequently I build propositions that stem from the findings chapters four and five to suggest models of innovation applicable to what innovation is, for and among social entrepreneurs.

3.3 Research design

A research design is a characterisation of the research strategy that allows one to address the research questions. I pursued a descriptive qualitative research design to allow me to describe how social entrepreneurs think about innovation. This design would be appropriate because of the relatively limited knowledge we have of such a conceptualization of innovation. I identified two social entrepreneurship related programmes in Silicon Valley, California as my source of identifying social entrepreneurs: The Global Social Business Incubator (GSBI) is hosted by the Centre for Technology Studies at Santa Clara University and the Entrepreneurial Design for Extreme Affordability (EDEA) programme is run at the D.School at Stanford University. The former is a professional programme or workshop that seeks to accelerate growth for existing social entrepreneurs while the latter is a university

degree module that serves as sort of incubator for their own students. I used the members of the programmes as a way of getting access to a diverse group of social entrepreneurs and because of the availability of textual sources (in the form of business plans) as well as the opportunity to carry out in-depth interviews and observations.

I was drawn to these programmes because some of the globally renowned social entrepreneurship cases such *Kiva, Whirlwind Wheelchair, Anudip, Toughstuff, Thrive, MIT OpenCourseWare, Vision Spring, Jaipur Knee, Embrace, and D-Light* can be traced back to these two programmes. Initially my reasons for going to California were logistical -- having access to historical documents in the form of business plan summaries from multiple social entrepreneurs and opportunity to meet with them in person. Both programmes have extensive networks that span far and wide into the social entrepreneurial community and participants originate from all over the world and likewise focus on diverse markets, mainly emerging and developing markets but also developed ones. And I found that the well-networked programmes in California provided a concentrated and accessible means by which to collect extensive and diverse data in a span of time that the Dphil allows – I consequently returned to California for another round of data collection, which I shall expound later. I therefore did not find it feasible nor necessary to find my social entrepreneurs among locals in the countries in which the social enterprises were being established because of complexities involved in multiple and historical document access, cost of extensive travel, and time limitation.

Recall the object of study is the innovation concept while the subjects of study are actors at the individual level comprising practitioners primarily social entrepreneurs and experts who work with social entrepreneurs such as academics, mentors, and investors.

Collectively these types of informants belonging to diverse geographical locations and diverse sectors altogether serve as the source of data for this meta-analysis of social entrepreneurs' perceptions of innovation. I also find that although the programmes are headquartered and convened in the West, there are contextual features that make these venues relevant and interesting to source data from, and I describe these contextual features in detail in section 3.3.2.

After exploratory fieldwork, negotiating access and final accumulation of data collection though, I decided to draw most of the data analysis and findings from one of these sites from which most of the data accrued -- the GSBI programme. I make use of a smaller amount of data from the second site, but nevertheless rich data, to perform a final external validity and restricted generalizeability test which I present in the appendix (A.6).

3.3.1 Research phases

The research data collection spanned 1year over the two research sites and is best described in three phases. In 2011 from September to November I conducted fieldwork at the two sites followed by a second round of fieldwork in 2012 from August to September which was more concentrated on one site. Phase 1 involved mostly archival document collection comprising business plan outlines. In phase 2 I contacted social entrepreneurs and administrators, organizers and academics from the directories of the two programmes to create a purposive sample. Respondents were approached through email and personal referrals. All were not available or accessible due to relocation or 'research fatigue', but from these two sources I was able to accrue 31 in-depth interviews in phase 2 and subsequently another 50 in phase 3 of data collection, amounting to 81 interviews. Table 3.3 shows how

many of the total participants were interviewed over the two phases 2 and 3. The phases will be explained in more detail below.

<See table 3.3, page 98>

3.3.2 Main research site

The main research site is the decade old reputed and recognized Global Social Business Incubator hosted by the Santa Clara University. The GSBI "has been helping social entrepreneurs build sustainable, scalable organizations since 2003. Over the years they have trained 165 entrepreneurs who have collectively gone on to positively impact the lives of 74 million people" (GSBI 2013). 95% of these are still in operation and 55% are scaling.

The contextual features of this community or network of social entrepreneurs are depicted in figure 3.1. Broadly, the community is one where the social entrepreneurs are both globally networked and formally recognized. Globally networked implies that these social entrepreneurs have broad global networks to be aware of the GSBI type Western based programmes and have the ability and means to apply to such a programme. The application process is both complicated and elongated requiring candidates to complete several exercises which help to shortlist applicants. Application to the programme is advertised through the social edge platform as well as through development agencies that work on the ground in many global countries. Formally recognized means that the applicants are labelled as social entrepreneurs by the programme and awarded certificates to this effect. The implication of this is that there may be some participants who never saw themselves as social entrepreneurs, and may still not, but they are recognized as social entrepreneurs having gone through the rigorous application and training programme.

The advantages of studying this type of community include quick access to a diverse group of social entrepreneurs who are geographically and sectorally dispersed. A substantial number of them convene at one place at one time, at least once a year, and the learning environment that brings them together allows for a conducive environment for sharing ideas not only amongst themselves but also potentially the researcher. Although the programme is headquartered and convenes in the West, the focus of most projects is on developing and emerging market contexts though not limited to them – many developed market social entrepreneurs also take part. The regional breakdown of GSBI alumni over the last decade is 29% in Africa, 21% in India, 15% in Latin America and The Caribbean, 12% in Asia and South Pacific, 6% in Canada and USA, and 13% worldwide.

All participating social entrepreneurs are well educated with higher degrees and speak English as a requirement for the programme attendance. To a large degree, the social entrepreneurs enjoy elite status and are role models for their communities. Again, as a requirement of the GSBI programme and the inculcation provided by DEA, the participants have high ambition to scale their products and services. By focusing on this group, I acknowledge that I do not study social entrepreneurs who fit in the "locally networked" and / or "not formally recognized" categories. Such would be locally situated and either not globally known or do not have access or means or desire to be global recognized or to have global reach. While important, these categories of social entrepreneurs can be future cohorts for an expanded study. This thesis concentrates on collecting data from social entrepreneurs who are globally networked and formally recognized.

<See figure 3.1, page 97>

3.4 Data collection

Insights are revealed through three sets of data: Archival innovation summaries from business plans which cover specific questions on the nature of innovation; semi-structured interviews, and participant observation at a boot-camp. Most of the data accrued from GSBI and I focus the findings from this one community. The stages of my data collection in crude sequence involved pilot interviews, document collection, indepth interviews, observations and again interviews. For reliability and authenticity I maintained meticulous records of the raw data, notes, transcriptions, and phases of analysis as briefly sampled in the appendix.

3.4.1 Field procedures

My credentials are of a researcher from Oxford University collecting data for my PhD research. There are no direct commercialization interests involved and the emerging work is meant to inform academic theory and knowledge practice. Consequently, the information collected in this study is used for the purpose of publishing the PhD dissertation and academic papers stemming from it. Should there be confidential information the respondents wish not to be published or the sources be left anonymous, the respondents were provided the option to do so.

I hold my research accountable to general ethical values such as respect, integrity and confidentiality, where requested by respondents. In particular, I tried to ensure that my project did no harm to individuals or organizations and for this formally went through the ethical approval from the Inter-Departmental Research Ethics Committee (IDREC) which is included in the appendix. In all circumstances, I made it clear to the respondents that discussion for purpose of research with me is entirely voluntary, that they

can opt out at any time, and can request anonymity or omission to content as and when desired. I shared audio files and transcripts with several interviewees who requested them.

Phase 1/Year 1: Archival Business Plans and Application Forms (2006-2011): During my first field trip to the region in fall 2011 I was able to accrue innovation summary documents from the Global Social Business Incubator and negotiate access for next year's bootcamp, the latter activity contributing to phase 3. I went through archival documents and collected 163 structured application forms which include business plans and answers to structured questions on the nature, target, and development of innovation. Data from 2008-2010 was not available to me as around those same days the GSBI offices in Santa Clara University faced theft of computers on which this data resided. Table 3.4 shows the number of innovation summaries by year of programme. The innovation summaries were drafted by applicants in response to the following questions put forth by the programme:

1. *How is your approach innovative (better then alternatives)?*
2. *Describe the key innovation(s) of your organization (e.g., business models, products or services, processes, value chain enhancements).*
3. *Explain the potential for these innovations to be deployed or replicated elsewhere.*
4. *Explain the potential for licensing these innovations.*
5. *Challenges and obstacles faced?*

<See table 3.4, page 98>

Although the full application forms exceeded 400 pages, I concentrated on the section on innovation as outlined by the above questions. These innovation summaries together amounted to 158 pages or around 65,000 words which were used in thematic analysis.

Phase 2 / Years 1 and 2: Interviews (Nov 2011- Sept 2012): Of the different forms of interviews possible, i.e. open-ended, focused, and structured or survey, I conducted semi-

structured interviews. Semi-structured interviews provide structure to focus on the problem of investigation and benefit from flexibility to reveal unexpected lines of enquiry (Grix 2004). I already had an idea of the questions to focus on (see interview guide in Appendix), yet wanted to leave it to the respondent to reveal insights beyond my current radar screen. So I conducted semi structured interviews using an interview guide with social entrepreneurs and others who work with social entrepreneurs. The questionnaire and methodology was approved by the Research Ethics committee (CUREC) of the University of Oxford following pilot study.

3.4.2 Pilot interviews

I completed a pilot phase of a draft questionnaire with two social entrepreneurs and two experts through previous contacts from my home institution. The questionnaire was revised in both sequence of questions and format of questions and two versions were created. One for those who were directly involved in an innovation related project, such as social entrepreneurs, and another for experts comprising faculty, mentors, and investors who work with social entrepreneurs but may not be directly involved in a specific project. The questions were the same across the two versions, only reworded to address the relevant respondent.

Though recorded, the pilot interviews were not transcribed and data from them was not analyzed. Instead, the aim of the activity was to better formulate the questions and the interview guide. The wording and sequence of questions was revised in light of the pilot interviews. It was clear respondents did not understand the use of academic language such as value chain or institutional voids, so questions were framed to avoid this academic language. Other questions were merged or split. It was also discovered that questions on competencies were difficult to answer for respondents particularly on the spot. And since this was a secondary focus of the research, this question was not asked. Overall, the interview guide

went through two iterations to make it agreeable to respondents as well as to preserve the intent of the study. The pilot and final interview guide are both displayed in the appendix.

Interviews during the pilot study lasted from half an hour to 1.5 hour, but on average one hour. Since the pilot interviews indicated that interviews would last on average an hour, it was deemed this can be tiring for both the interviewer and interviewee. So I opted for face to face interviews, usually over coffee, in all cases. In two circumstances this was not logistically possible, so video "Skype" interview was conducted.

3.4.3 Sampling

I use purposive sampling to identify the community or network of social entrepreneurs represented by the contextual features outlined in figure 3.1. Respondents are drawn from this community because they enable exploration of the particular aspect of behaviour relevant to the research study (Mays and Pope 1995). Further, statistical and probabilistic representativeness was not required since the objective was to understand social processes (Mays and Pope 1995). Purposive sampling allows me to draw a wide range of types of informants and also to select key informants who are likely to divulge relevant and important knowledge. So I approached not only social entrepreneurs but also those who work with or understand social entrepreneurs, specifically mentors, investors, and programme tutors and organizers. Respondents are globally networked and formally recognized participants of the two Western based communities or networks that seek to identify, build, and nurture social entrepreneurs.

I approached as many of the respondents for which contact info was available. Respondents agreed to answer questions based on their availability and willingness. In some cases, respondents referred potential interviewees, and if they fitted within the above

contextual characteristics and the programmes, they were approached for interviews. In phase 2 of data collection, I identified 24 projects from the DEA programme. From these projects 46 individuals were contacted resulting in 11 interviews. Of these 10 were face to face and 1 skype video interview was conducted. For the GSBI SCU programme, over 150 alumni were included in their directory but most of them were abroad. Incidentally though 15 social entrepreneurship organizations were attending the co-hosted GSBI-Tech Awards to which I was invited to attend. Through these 15 projects, I contacted 32 individuals, and eventually gained 20 face-to-face interviews. These interviews were transcribed and used as part of the analysis. I describe the representativeness of these informants during phase 2, who they were, where they come from, which sector they worked in, and the length of each interview in table 3.5.

<See table 3.5, page 99>

Phase 3 / Year 2: Participant Observation (Aug 11-Aug 24, 2012): During the phase 1 trip to GSBI in 2011, I was invited to participate and observe first-hand the talk among social entrepreneurs as they convened for the annual workshop or boot-camp. This was an opportunity to observe and collect face-to-face interviews from a large and diversified group of real social enterprise ventures. So I returned to the GSBI research site A in late summer 2012 for its tenth anniversary programme.

Each year the GSBI selects and 'admits' 20 enterprises from around the world that work in various sectors such as renewable energy, mobile, economic empowerment. The actual programme runs over a 8-month period from May to December by which the GSBI equips selected social enterprises to scale up their impact. Mid-way in August, everyone convenes for an in-residence two week boot camp to learn from each other and from VCs, investment and foundation heads, technology leaders, and business model experts who serve

as mentors or trainers. This intense group programme provided an opportunity to explore interesting and relevant themes pertaining to the actual discussions social entrepreneurs have among themselves and with those they work with.

It was not possible to conduct the ethnographic technique of participant observation since I am not and could not disguise myself as a 'team member'. However I was allowed to sit in on through the whole process as an active and direct observer. I gained approval from the GSBI organizers to participate for observations and interviews and was introduced to all the participants as a 'researcher doing my PhD'. On further informed consent, I introduced myself to each person I met for the first time as a visiting researcher working on understanding innovation as viewed and practiced by social entrepreneurs.

A social entrepreneurs' typical day at this in-residence programme includes eight hours of classroom work led by presenters from business, academia, and successful social enterprises followed by two to three hours of evening work in which social entrepreneurs work together and with their mentors to develop organizational plans, business models, presentations, and tactical plans. The programme culminated in all day business plan presentations on Aug 23th which was attended by hundreds of Silicon Valley notaries.

I not only attended all working sessions, but stayed with the cohort 24 hours a day over two weeks as all of us were accommodated and provided meals at the conference rooms. This provided a privileged opportunity to observe and converse with the cohort both inside workshop activities and outside during leisure time. The sources of information focused on observing the conversations between themselves and for conducting interviews face to face. The exposure to how the participants progressed through the activities and exercises of the

boot-camp provided an additional source of data and insights. Consequently, my understanding of the phenomenon was broadened as a result of the discovery process through this mostly observatory and partly participatory experience.

The cohort comprised of ten women and ten men operating in sixteen countries. Eight work in sustainability (clean energy, environment), four in area of economic development (agriculture, artisan products, culture, tourism, and financial services), two on issues concerning infrastructure (ICT, technical assistance services, supply chain services, facilities development), and five in health and human needs (water, public health, education, housing development). However, there were several more social entrepreneurs than the 2012 cohort as they came as either workshop presenters or mentors and I was able to interview several of these too.

In addition to field notes from observations, I accumulated 50 interviews which ranged from sporadic few minute interactions and conversations to in depth interview sessions that lasted over an hour. The respondents drew from four categories, entrepreneurs, organizers or faculty, mentors, and investors. Several mentors were in fact investors so I was not sure which category to place them. I chose mentor since that was the explicit role the programme organizers entitled them although they were 'on the look-out' for investment. I interviewed 39 people and interacted with another 11. Please see table 3.3 for summary breakdown. Table 3.6 provides a more detailed list of the informants.

<See table 3.6, page 100>

While interviews were one-on-one conversations with me the researcher, interactions were observations and listening in on conversations and discussions among participants on themes related to the research study. So although they weren't directly answering my questions, they were nevertheless answering them and I was listening, for which reason I considered them as informants for sake of analysis.

I asked all 50 respondents four main questions extracted from the original interview guide that could be ideally asked and answered over the course of coffee breaks, networking sessions, and walking along to and from the conference centre lodges. Depending on the availability of the respondent and their willingness to speak more on the topic, I conducted further lengthy interview protocol guided interviews. The quick interview questions were:

1. *In what way have you come across innovation?*
2. *What is your perception about it? Can you provide examples?*
3. *How could it be useful to you or others?*
4. *What lessons have you learned?*

Even though I had already been introduced by the GSBI organizers as a visiting researcher there to observe, interact and have discussions with the participants for my research study, I re-introduced to each person I first met as a visiting researcher here to observe the GSBI workshop activities for my Phd research I then asked the above four questions, crudely in the sequence laid out. If the narratives lasted long, I explicitly then asked if I could audio record the conversation for research purposes. So a few of the detailed conversations were audio recorded. But for these too detailed notes were written out and the notes compared with actual transcriptions for purposes of reflexivity according to which the researcher depends "on one's interpretative resources to make sense of what the person is

saying, but at the same time one is constantly checking one's own sense-making against what the person actually said' (Smith, Osborn & Smith 2003, p.72).

However most were not audio recorded as these were 'convenient' interviews carried out often during breaks, sessions, or group work. Getting formal consent for audio recording during social breaks would have been considered both somewhat 'rude' and might have had the potential drawback of not eliciting frank and impromptu insights immediately relevant to the context of the gathering. Detailed notes were quickly written down within an hour or so of the discussion for all one-on-one discussions and lectures and other observations. In all 242 passages amounting to 9000 words were extracted for thematic analysis from the hand written notes from this phase alone.

3.5 Data analysis

Content analysis provides an objective analysis of written materials and can identify meaning from textual data. Thematic analysis is a type of content analysis which involves the identification of themes or major ideas in any set of textual documents. Template analysis in particular is a type of thematic analysis which follows an iterative approach to highlight themes and their associated patterns through the continuous development of a template.

In developing the category scheme, on the one hand, criterion of reliability induces analysts to derive standard categories from theory that could be repeatedly used. On the other hand, the criterion of validity calls for analysts to inductively develop original categories that stem from the phenomenon (Srnka and Koeszegi 2007; Druckman and Hopmann 2002). While some methods call for analysis to begin without any notions of a priori codes or areas of interest, this is seldom easy.

Researchers often review existing literature and then consciously choose to ignore it in the interest of developing purely grounded theory (Glaser and Strauss 1967). For instance, Weerawardena and Mort (2006, p.25) write, "Having reviewed the literature and found it to be theoretically inadequate, we follow the recommendation of Stern (1994). We put the literature aside and turned to the field to focus on the phenomenon of social entrepreneurship to inductively derive a theoretical model from the phenomenon." I find this conscious decision to "put the literature aside" as being rather difficult in practice. As part of the process of reflexivity, I discovered this was difficult for me to adhere to given my extensive reading of topic related literature and informal discussions before and during the selection of this project.

So although, I was motivated by inductive reasoning, "in which you would collect data and develop theory as a result of your data analysis" (Saunders et al 2007; p. 117), I opted for retroductive reasoning and coding (Ragin 1994) and template analysis (King 2004a;b). In retroduction as depicted in figure 3.2, I use an inductive -- deductive procedure, because it combines the advantages of both towards achieving reliability and validity. The different phases of my research design iteratively employ a back and forth process of using theory and inductive analysis which allow for a newly constructed or at the least, an extended theory. I begin with categories identified from both literature as well as initial data analysis and iteratively adapt them to better address the research problem and match the themes gathered from the data. In this approach it is acknowledged that prior knowledge of the theory partly determines what one looks for and appropriate rules are specified for data analysis.

<See figure 3.2, page 97>

So an initial conceptual framework is developed after reviewing secondary literature and popular secondary cases. The conceptual framework helps define the terms of what I think might be expected from the data. This conceptual framework is 'emergent' and is informed by each subsequent source of data. The data analysis follows an iterative process in which I move back and forth between the emerging thematic understanding of the data and existing literature (Miles & Huberman 1994). The accuracy of any method depends on analyzing appropriate data that are representative of what is being researched and what is occurring to prevent inaccurate or biased results. Eventually this will have been revisited iteratively in light of the qualitative data to come up with what might pose as models of innovation as perceived by social entrepreneurs. It is expected that this will develop into a theoretical framework grounded in data which in future studies can be set up in a way to become testable.

For analysis Nigel King's (2004a;b) template analysis acknowledges the awareness of any a priori themes, in particular as generated from a sample or subset of the data. These themes are construed to be strongly relevant to the analysis though they may be modified or dispensed should they prove not be useful or appropriate to the actual data examined (King 2004a). This initial template is then applied to the whole data set and segments of data that appear to be of relevance to the research question(s) are highlighted and coded where they correspond to the a priori themes in the template. If a new theme is encountered the initial template is revised in light of the new category. Once a final version of the template is defined, and all transcripts have been coded to it, the template serves as the basis for the researcher's interpretation and illumination of the data set (King 2004a).

3.5.1 Validity and reliability

Of the twelve strategies suggested by Johnson (1997) to promote qualitative research validity (descriptive, interpretive, and theoretical) and reliability, I use the following four strategies:

1. Extended fieldwork: It is suggested that the researcher should have adequate time to become thoroughly familiar with the context under scrutiny and in turn for the participants to have had the opportunity to become accustomed to having the researcher around (Mays and Pope 1995). In quantitative research credibility depends on instrument construction and in qualitative research “the researcher is the instrument" (Patton 2001, p. 14 in Golafshani 2003). For this reason the two field trips made to the GSBI over two years was useful in gaining both mutual familiarity as well as increased trust. The first trip helped to gather interviews and archival documents but was conducted outside of the actual 'boot-camp' time-frame. The second trip's goal was observation and interviews during the very intense 'boot-camp'. The first trip was particularly beneficial in gaining largely unrestricted access from the GSBI organizers and facilitation to meet with and approach not only organizers but all participating social entrepreneurs, mentors, investors, and tutors.

2. Data Triangulation: Triangulation is defined as “a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study” (Creswell & Miller 2000, p. 126). So I use convergence of multiple types of data from within the main GSBI community and then follow this up with a test of convergence of data from other sites (Denzin 1978). This triangulation technique involves being able to cross-check and corroborate interpretations through multiple data sources. In my empirical chapters I show data from document analysis and interviews both of which support the models divulged.

3. Peer Review: The intent here is to have my own interpretations and conclusions reviewed by other disinterested and therefore unbiased researchers such as those not directly involved with the research (Barbour 2001). The role of such peers is to be skeptical and challenge me to validate findings through evidence from raw data as well as trail of analysis procedures. I accomplished this by having my supervisors go through the data as well as by presenting the findings at several international and local conferences some of which were the Academy of Management in Boston (2012), Trans-Atlantic Doctoral Conference at London Business School (2012), and the West Coast Research Symposium at University of Southern California (2012).

4. Reflexivity: This is a process of continual self-awareness and critical self-reflection by me as a researcher throughout the research study. The intent is to avoid potential biases and predispositions which may affect the research process and findings. I made myself aware of these in part through repeated supervisory meetings, peer review, and conference presentations as outlined above.

3.5.2 Generalizability test

I acknowledge the intent of qualitative studies is not to infer or generalize findings from a sample to a population. So generalizability in the statistical sense is neither the goal of this study nor even possible in the quantitative sense since sampling is not randomized. But generalizability is often a part of enhancing theoretical validity of the findings (Johnson 1997). And as Johnson, I argue that a rough generalization to similar settings, people, and time can be attempted. This process of generalizing based on similarity is called naturalistic generalization (Stake 1990) and replication logic (Yin 1994). For instance, experimental researchers who too do not have random samples use replication logic to generalize beyond the contexts of their own studies.

In appendix A.6 I attempt to investigate whether the findings from the GSBI also apply to the DEA-Stanford community which is contextually similar in nature. Since the DEA-Stanford cohort fit in the same quadrant of contextual characteristics as does the GSBI cohort (figure 3.1), the findings from the GSBI can be corroborated and partially generalized to other social entrepreneurs within the same quadrant. I make use of the rich narrative in eleven interviews from the DEA-Stanford for corroboration of results and some degree of generalizability, albeit limited to the purposive sampling quadrant of those social entrepreneurs who are globally networked and formally recognized.

I believe this process can both be an exercise in corroboration, verification and limited generalizability for qualitative research. But I would like to clarify, that the intent is not to generalize the coding scheme and models of innovation revealed from the GSBI to all social entrepreneurs, but to hint whether the same themes can be found in a sample which is very close in nature to the original sample (replication logic). And if not, what implications might this have on the findings.

3.5.3 Data presentation

In this section I provide a brief description of how raw data and thematic codes are presented in chapters 4 and 5. The unit of analysis for research question 1 is the innovation concept and for questions 2 and 3 it is the value chain. The units of measurement are themes or ideas, regardless of phrases, sentences, or words. These are extracted from archival textual documents, primary interviews, and observation field notes. As explained above, data is analyzed to identify thematic codes as exemplified by supporting data extracts. For research question one I came up with 25 first order codes and 8 second order codes while for research questions two and three I came up with 32 first order and 9 second order codes.

The steps in data coding were as follows: First, I categorized data snippets into several first order codes. Second, I identified patterns and connections among the first order codes to find common aspects that explained the variation and similarities across second order themes. In the third and last stage of coding, I aggregated second order codes into third level abstractions which were reflected in current theoretical literature. However, the steps in data presentation in chapters 4 and 5, outline first codes by second order themes each supported by quotes from data snippets. It made more sense to outline evidence around second order codes and then by first order codes followed by a discussion of the third level theoretical abstractions. Embedded within chapters 4 and 5 throughout are various tables that outline raw data, data as supporting first, second, and third level codes, and breakdown in number of passages that fall into the three levels of abstraction.

It may be noted that the categorization structure presented does not comply with the MECE principle -- i.e. mutually exclusive and collectively exhaustive. As will be explained in detail in chapter 4, categorization of clauses is neither mutually exclusive (some clauses address more than one construct) nor collectively exhaustive (some clauses address no constructs or there may be important constructs but not reflected in the clauses collated from data). Although MECE would present an optimum arrangement of information to be exhaustive and would not double count at any level of the hierarchy, it was not possible to adhere to since textual snippets often addressed multiple inter-related constructs. These overlaps however turned out to be useful as they provided a means to cross link themes which in turn helped develop the models of innovation.

3.6 Summary

As is the common practice in qualitative research, this study pursued a general analytic approach that analyzed evidence to generate codes often based on the natural language of the interviewee or document. The codes were amalgamated based on similarities and relevance to develop sub-themes and then progressively a smaller number of overall themes. Chapters 4 and 5 report these codes and sub-themes in depth along with supporting data. The themes helped generate propositions. Finally the themes and propositions were integrated into coherent models of innovation as perceived by social entrepreneurs. Consequently in chapter 6 I returned to the literature, to compare the emergent themes and propositions with existing knowledge to highlight conflicting and similar constructs or frameworks. This practice conforms to the widely acclaimed guidelines of Eisenhardt (1989) on relating emergent theory to extant literature to improve internal validity and generalizability at the theoretical level. Finally, the emergent abstract conceptualization was then discussed in chapter 7 in light of implications for theory and practice.

Figure 3.1 Contextual elements of research sites

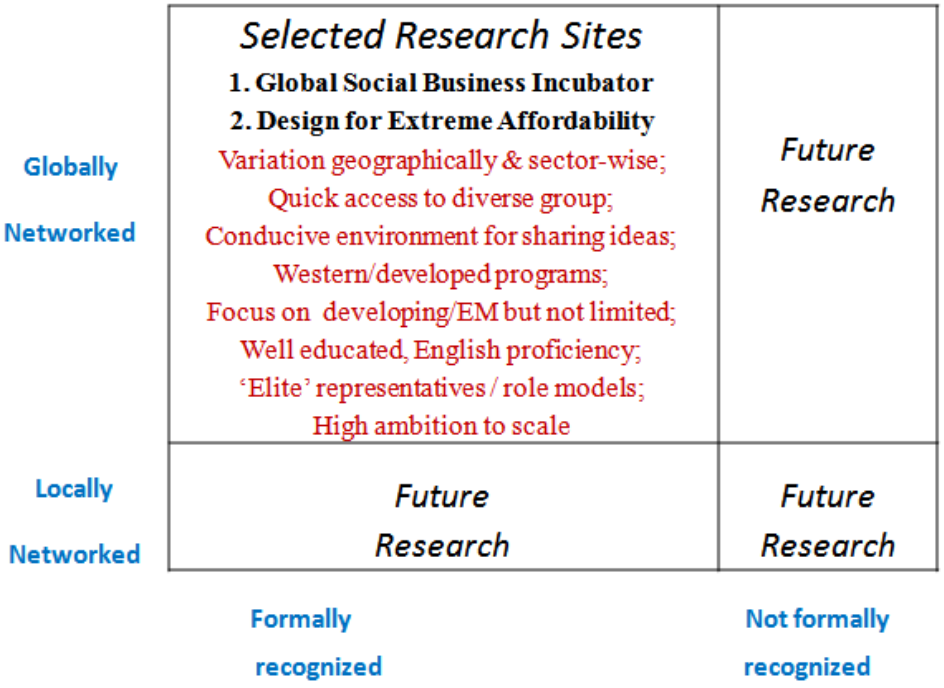


Figure 3.2 Retroduction as iterative combination of induction and deduction (Ragin and Amoroso, 2010, p.60)

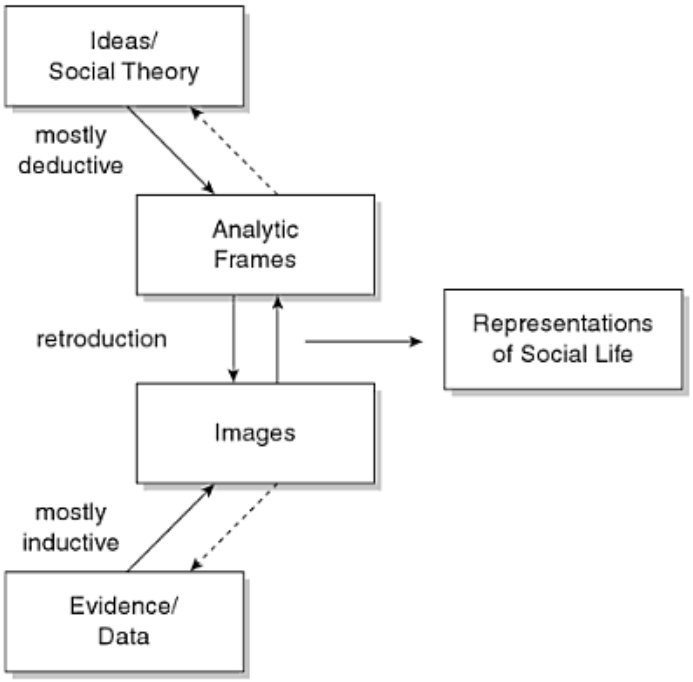


Table 3.1: Research questions and objectives

Main question: How do social entrepreneurs perceive innovation broadly and under extreme conditions marked by institutional voids and resource scarcity?	
Sub-Question	**Objective**
1. How do social entrepreneurs conceptualize innovation?	To investigate through exploratory and descriptive analysis what social entrepreneurs think about innovation and say they do as opposed to what they 'really' do on the ground.
2. How do they conceptualize innovation under institutional voids?	To determine how this perception and view on innovation is shaped when confronted by the contingency of institutional voids.
3. How do they conceptualize innovation under resource scarcity?	To determine how this perception and view on innovation is shaped when confronted by the contingency of resource scarcity.

Table 3.2: Components of research process adopted for this study

Research Process	
Research Philosophy or Paradigm	Post –positivistic critical Realism (not Interpretivism)
Research Approach	Iterative mix of induction and deduction: Retroduction
Research Strategy	Individual level "cases"
Time Horizon	Cross-sectional over two years
Data Collection Method	Secondary literature, Archival documents, Participant Observation, and Interviews

Adapted from: Saunders, Lewis, and Thornhill (2003)

Table 3.3: Total interviews over phases 2 and 3

Phase 2	**Interviews**		**Phase 3**	**Interviews**	**Interactions***	**Total each community**
Site A: GSBI			**Site A: GSBI**			
Entrep (E)	12		Entrep (E)	16	7	Both interview & interaction = 5
Experts (F)	8		Experts (F))	10	3	Site A Phase 2 = 20
Site B: DEA			Mentors (M)	9	3	Site A Phase 3 = 39+16 - 5=50
Entrep (E)	10		Investors (I)	4	3	
Experts (F)	1					**Site A Total =70**
Sub-Total	**31**		**Sub-Total**	**39**	**16**	**Site B Total =11**

*Interaction means a conversation among group members on the related issues was observed.

Table 3.4: Innovation summary documents

Year	**Number**
2005	23
2006	35
2007	59
2011	46
Total	163

Table 3.5: Respondent profile for phase 2

	Code	Site	Type	Solution	Sector	Interview (minutes)
1	A1E	A	SE & Expert	Education	Education	79
2	A2E	A	SE & Expert	IT Jobs	Economic Development	81
3	A3E	A	SE	Transportation & banking	Economic Development	65
4	A4E	A	SE	Mobile pump regulator	Economic Development	108
5	A5E	A	SE	Mobile banking	Economic Development	84
6	A6E	A	SE	Foot Pumps	Economic Development	41
7	A7E	A	SE	Off grid lighting	Energy	66
8	A8E	A	SE	Educational media	Energy	19
9	A9E	A	SE	Clean Water	Sanitation	55
10	A10E	A	SE	Clean Water	Sanitation	29
11	A11E	A	SE	Female pads	Healthcare	41
12	A12E	A	SE & Expert	Eye Hospital	Healthcare	43
13	A13F	A	Expert	N.A.	Researcher	64
14	A14F	A	Expert	N.A.	Professor and Organizer	97
15	A15F	A	Expert	N.A.	Mentor	29
16	A16F	A	Expert	N.A.	Professor	32
17	A17F	A	Expert	N.A.	Assoc Dean	43
18	A18F	A	Expert	N.A.	Dean	65
19	A19F	A	Expert	N.A.	Professor	31
20	A20F	A	Expert	N.A.	Engineer	45
						1117 (19 hrs)
1	B1E	B	Entrep	Pepper grinder	Economic Development	63
2	B2E	B	Entrep	Foot Pump	Agricultural Machinery	66
3	B3E	B	Entrep	Fertilizer pellet applicator	Agricultural Machinery	60
4	B4E	B	Entrep	Deep Treadle pump	Agricultural Machinery	65
5	B5E	B	Entrep	Nasal interface	Healthcare	54
6	B6E	B	Entrep	Prosthetics	Healthcare	94
7	B7E	B	Entrep	Toilet	Sanitation	41
8	B8E	B	Entrep	Water storage	Sanitation	42
9	B9E	B	Entrep	Toilet	Sanitation	62
10	B10E	B	Entrep	Hand cleanser	Sanitation	74
11	B11F	B	Expert	N.A.	Professor and Organizer	75
						696 (12 hrs)
					Total minutes	**1813 (30 hrs)**

Table 3.6: Respondent profile for phase 3 all from site A

	Code	Type	Solution	Sector	Engagement
1	22E	Entrep	Water filters	Water	Interview
2	35E	Entrep	School lighting	Education	Interview
3	51E	Entrep	Radio media	Education	Interaction & Interview
4	13E	Entrep	Farm fertilizers	Agriculture	Interview
5	45E	Entrep	Agri insurance	Agriculture	Interview
6	7E	Entrep	Health clinics	Healthcare	Interaction
7	44E	Entrep	Eye hospital	Healthcare	Interview
8	14E	Entrep	Sanitary pads	Healthcare	Interview
9	11E	Entrep	Sanitary pads	Healthcare	Interview
10	3E	Entrep	Wheelchairs	Healthcare	Interaction
11	31E	Entrep	Solar lights	Energy	Interview
12	30E	Entrep	Organic fuel	Energy	Interaction
13	28E	Entrep	Solar lights	Energy	Interview
14	25E	Entrep	Solar lights	Energy	Interview
15	23E	Entrep	Solar lights	Energy	Interview
16	4E	Entrep	Rice husk power	Energy	Interview
17	46E	Entrep	Cookstoves	Energy	Interview
18	5E	Entrep	Solar lights	Energy	Interaction
19	43F	Entrep	Mobile charging	Economic Development	Interview
20	42E	Entrep	Micro-credit checks	Economic Development	Interaction
21	38F	Entrep	Mobile finance	Economic Development	Interview
22	6E	Entrep	Distribution network	Economic Development	Interaction
23	9I	Investor	N.A.		Interaction
24	50I	Investor	N.A.		Interview
25	48I	Investor	N.A.		Interaction
26	47I	Investor	N.A.		Interaction
27	27I	Investor	N.A.		Interview
28	17I	Investor	N.A.		Interview
29	10I	Investor	N.A.		Interview
30	49M	Mntr	N.A.		Interview
31	41M	Mntr	N.A.		Interaction & Interview
32	37F	Mntr	N.A.		Interview
33	36M	Mntr	N.A.		Interview
34	33M	Mntr	N.A.		Interaction & Interview
35	32M	Mntr	N.A.		Interview
36	2M	Mntr	N.A.		Interview
37	26M	Mntr	N.A.		Interaction
38	24M	Mntr	N.A.		Interview
39	19M	Mntr	N.A.		Interview
40	18M	Mntr	N.A.		Interview
41	8F	Organizer	N.A.		Interview
42	53F	Organizer	N.A.		Interaction & Interview

43	34F	Organizer N.A.		Interview
44	29F	Organizer N.A.		Interview
45	21F	Organizer N.A.		Interaction & Interview
46	20F	Organizer N.A.		Interview
47	1F	Organizer N.A.		Interview
48	16I	Organizer N.A.		Interaction
49	15F	Organizer N.A.		Interview
50	12F	Organizer N.A.		Interview

*E: Social Entrepreneur; F: Faculty or Staff Organizer; M: Mentor; I: Investor

Table 3.7 Summary of research design

Main Research Question	Sub Questions	Objective	Contribution	Conceptual Level of Analysis	Data Sources	Analysis Strategy	TRIANGULATION of DATA & RESULTS
How do social entrepreneurs conceptualize innovation broadly and specifically under extreme conditions marked by institutional voids and resource scarcity?	*How do social entrepreneurs conceptualize innovation?*	To investigate through exploratory and descriptive analysis what social entrepreneurs think about innovation and say they do as opposed to what they 'really' do on the ground.	Contributes to perceptions and key features of models of innovation relevant for management theory and policy.	Innovation as a belief system	***PHASE 1:*** *Document analysis*: 163 Innovation summaries from 2005 (23), 2006 (35), 2007 (59), 2011(46) ***PHASE 2:*** 31 *in depth interviews* at GSBI-DEA of Social entrepreneurs, innovators, academics, and investors as expert discussants (2011-12) ***PHASE 3:*** *Participant observation and interviews:* 50 participants GSBI social entrepreneur workshop and innovation lab (2012)	Use meta Thematic Content Analysis to create initial template	
	How do they conceptualize innovation under institutional voids?	To determine how this perception and view on innovation is shaped when confronted by the contingency of institutional voids.	Contributes to the literature on how contextual conditions shape innovation.	Value chain of service or product		Apply template analysis to all data and revise 1st order codes	
	How do they conceptualize innovation under resource scarcity?	To determine how this perception and view on innovation is shaped when confronted by the contingency of resource scarcity.	Specifically advances theoretical models of innovation by bridging the literatures on innovation with institutional theory and resource dependency.	Value chain of service or product		Iteratively improve template and reveal 2nd order codes	
Multiple sources of qualitative data and retroductive analysis (Ragin & Amoroso 2010) helps triangulate findings.						**Theory Development**	

4 HOW DO SOCIAL ENTREPRENEURS CONCEPTUALIZE INNOVATION?

4.1. Introduction

Much of the research on social entrepreneurship is focused on who are social entrepreneurs and what they do. Recall this project opens a different direction by asking: How do social entrepreneurs perceive innovation broadly and under extreme conditions marked by institutional voids and resource scarcity? This was broken down into three distinct sub research questions of which the first was "How do social entrepreneurs conceptualize innovation?" This chapter reveals findings for this first sub research question based on thematic content analysis of data.

The purpose in this chapter is to reveal insights on how organizational theorists can better frame theoretical models to understand innovation among social entrepreneurs. I gathered data on what social entrepreneurs said they do. So my findings rely on this narration as opposed to what they 'really' do on the ground. The practise of innovation often involves change brought about by an iterative approach requiring experimentation and strategy reformulation. My methodological approach uses documents, interviews and observations to tease out perceptions of innovation among social entrepreneurs by fostering for them to self-introspect and retrospect. In other words, this qualitative methodology provides social entrepreneurs an opportunity to think about and be mindful of what they or others did or are doing in relation to innovation. Consequently, although I acknowledge the limitations of the extent to which claims can be made with perceptual data, I believe the narration by social entrepreneurs on what they *think* about what they do can be useful in understanding perceptions and features of models of innovation that can in turn be relevant for innovation management theory and policy.

I find that innovation among social entrepreneurs as opposed to the coherent phenomenon presented in current literature is in fact a disparate range of understandings that stem from varied motivations, means and outcomes. By using innovation as a concept for the conceptual level of analysis, the findings show how competing logics interact to shape an emerging field through the introduction of new concepts. These concepts described by new vocabularies serve as boundary objects through which varied actors interact to build a community of shared interests and values. I divulge these shared values which provide some cohesion to the seemingly disparate notions of innovation among social entrepreneurs.

4.2. Analysis and coding

I analyzed qualitative data comprising texts, interviews and field notes in broadly four stages. I say broadly because the stages were not a purely sequential process, but rather I moved back and forth in an iterative and systematic process. The use of both archival data from 163 entrepreneurs and interview and field-notes from observing 70 respondents provided a means for triangulation of findings. In this section I reveal this process to show how I went from the data to the findings I divulge in this chapter. The four main stages for analysis are summarized in table 4.1.

<See table 4.1, page 145>

In the first stage I collated data from the different sources comprising application forms (which contained business plan and innovation summaries), transcribed interviews, and digitized and scanned hand written field notes. Descriptions from the application forms were already categorized around the following questions asked of the applicants:

1. How is your approach innovative (better then alternatives)?
2. Describe the key innovation(s) of your organization (e.g., business models, products or services, processes, value chain enhancements).
3. Explain the potential for these innovations to be deployed or replicated elsewhere.
4. Explain the potential for licensing these innovations.
5. Challenges and obstacles faced.

Although the full application forms exceeded 400 pages, I concentrated on the section on innovation as outlined by the above questions. These innovation summaries together amounted to 158 pages or around 65,000 words which were used for thematic analysis. A total of 281 quotes were coded which formed the basis for the first order constructs divulged in this chapter. Table 4.2a shows a snapshot of responses found in the application forms.

<See table 4.2a, page 146>

Similarly, descriptions from the interviews and observation notes were categorized around four main investigative themes. These four investigative themes were reflected in four main questions, also embodied within the interview guide, as asked of all respondents in the interviews and also used for analytical purposes.

1. In what way have you come across innovation?
2. What is your perception about it? Can you provide examples?
3. How could it be useful to you or others?
4. What lessons have you learned?

Table 4.2b shows some of the responses categorized around these four questions. In all 242 passages from this data source were used in the coding.

<See table 4.2b, page 147>

I pursued thematic content analysis and adopted a template analysis technique proffered by King (2004a;b). King's template analysis technique combines the approach outlined by Powell and Renner (2003) of employing preset categories and emergent

categories where I start with some initial categories after going through the data on the first read and then add emergent ones as they became apparent from iterative reviews of the different sources of triangulating data (documents, interviews, and observations). I used color codes and outline shapes to analyze the first reading through all material. These color codes and shapes were used to cluster notes into the main four investigative themes posed above. As an example, in figure 4.1, I show screen shots of notes with first pass on analysis. This first round through documents comprised of at least three thorough readings before settling on passages to code. The passages addressed a common idea or thought as labelled by the first order codes or constructs.

<See figure 4.1, page 142>

An issue arising with this was that during first order coding, passages (or extractions) could overlap and therefore be double coded across first order codes and second order categories i.e. the principle of MECE did not apply (mutually exclusive and collectively exhaustive). Using sentences may alleviate this but I felt then the idea or thought could be potentially lost from the context of discussion. I used a means to cross index double coded passages to help identify linkages and relationships which were useful for identifying the second order codes. (I found these linkages to be later useful for conceptualizing models.)

In the second stage, I categorized the information by identifying the first order constructs or codes. Although the epistemological stance during the whole study is interpretevist or subjective, when conducting thematic content analysis the researcher's epistemological stance is objective or objectivisitic (Anderson 2007). By this Anderson means that categories and themes are labelled and grouped in a manner that matches as closely as possible to the actual words of participants and the texts. Interpretation at this stage of building the thematic content analysis categories and themes is kept to a minimum.

So I used in vivo first order codes, i.e. words taken from the text, to form the basis for identifying and generating first order codes. These words are underlined in the quotes shown in the next section. Every time I read through the data, I created provisional categories which required I go back to all previous data to recode and check to see how it fits into the revised category template. Sometimes categories were merged and split. At few other times categories were entirely deleted when data did not fit and new provisional categories created and the template modified. The provisional categories were also sometimes re-named so as to be more representative of all codes and therefore more comprehensive. Anderson also suggests to err on the side of building too many categories and themes while maintaining a degree of standalone understanding of each meaning unit. For research question one, this process helped come up with 25 first order codes which are shown in table 4.3.

<See table 4.3, page 149>

Qualitative descriptive studies entail the presentation of the facts of the case in everyday language (Sandelowski 2000). My interpretation as affected by my own feelings and thoughts on what the themes signify or mean are forestalled till the discussion. But during the exercise of reflexivity I acknowledge these initial categories may have been affected by the theoretical knowledge I had accumulated and moderated by the data collection process, which is why I adopt Ragin and Amorosso's (2010) notion of retroduction as opposed to pure induction.

Instead of the orthodox dichotomous choice between purely deductive or inductive research, I adopt a middle ground of retroduction which is an iterative combination of induction and deduction (Ragin and Amoroso 2010). In this retroductive coding scheme (Ragin 1994) I alternate between a priori and inductive codes. The categories are based on relevant theoretical frameworks and generated prior to the analysis (Ghaziani and Ventresca

2005). The categories are agreed upon by professional colleagues before the coding is applied to the data (Weber 1990). I do this professional check through continued peer and supervisors' feedback. Thus the initial list of categories changed in an iterative fashion to accommodate data that did not fit the existing labels during each iteration. This type of coding strategy according to Ghaziani and Ventresca (2005) improves reliability (Stemler 2001). This research strategy also helps mitigate the two most common mistakes in using theory to generate a conceptual framework -- overuse and under use of existing theory (Maxwell 2005).

The iterative process of revisions is continued up to a point where mutual exclusivity and exhaustiveness is maximized (Weber 1990). While attempts were made to create mutually exclusive and exhaustive categories, this was not entirely possible. As cautioned above, sometimes data fit into two or more categories as will be evident as I outline the data results. And as alluded to earlier, I cross-index these overlapping categories. In highlighting such codes, I also find that some themes occurred together consistently in the data. For instance, when I find the first order theme of "for underserved", I also find one of the first order themes associated with profit motives under the second theme of "for what".[10] Such simultaneously occurring themes were useful in groupings that created the four third level theoretical labels.

In the third stage, and probably the trickiest part of the analysis, I sought to understand patterns and connections among the first order codes to integrate them into second order themes. I did so by repeatedly reviewing the first order codes and identifying a means by which I could find common aspects that explained the variation and similarities across themes. These eight common aspects or dimensions were analytical queries on who does the innovation (by whom), for whom is the innovation (for whom), for what purpose (for what),

[10] This for instance would have been expected given the cohort are social entrepreneurs.

what is the economic motive (economic orientation), what is the nature of the solution (nature of solution), whether it is necessity or ideational based, and what degree of scalability is strived for (scalability). These cross cutting dimensions are akin to developing second order themes. I created an intermediate table 4.4 showing all first order constructs that addressed each of these eight dimensions.

<See table 4.4, page 149>

Finally in stage four of the analysis, I sought to aggregate the perceptions of innovation, grouped by second order codes into higher level theoretical abstractions. I did so with the help of table 4.4 which shows how all three, first, second, and third level themes came together in both horizontal and vertical groups. One would ideally label the theoretical higher level abstractions based on existing concepts found in literature (deduction). If this is not possible, then one labels emerging concepts. The labelling of four vertical groups shown in table 4.4 was done in light of existing literature that resembled these groups and served as third level theoretical dimensions or themes: User based, Efficiency based, Social based, and Challenge based. The archival data from 163 entrepreneurs and interview and field-note data from observing 70 respondents triangulated the coding template and helped validate the findings. The 25 first order codes were coalesced into 8 second order and finally 4 third level aggregate dimensions. Figure 4.2 shows only the first order codes and third level dimensions while table 4.4 shows how the intermediate second order codes played a mediatory role.

<See figure 4.2, page 143>

Table 4.2c shows a summary breakdown in the 523 passages that supported the findings from data triangulation outlined in this chapter. Most of the data supported social-based innovation, followed by challenge-based, user-based, and efficiency-based innovation. Not surprisingly, the least representation was of efficiency since that is usually associated

with large firms, while the community of observation represented start-ups. Table 4.5 shows exemplary quotes from the application forms from entrepreneurs that support different conceptions of innovation (user, efficiency, social, challenge). Tables 4.6 a,b,c and d each list out in detail representative data from interviews that support these four broad conceptions of innovation by social entrepreneurs.

<See table 4.2c, page 148>

<See table 4.5, page 150>

<See tables 4.6a, b, c, and d, pages 152, 153, 154, 155>

Beyond this, the labelling of emergent concepts was done based on respondents' frequent narration of a certain type of innovation as they explained their viewpoints. This was sometimes referred to as social, frugal, jugaad, or constraint related, and sometimes extreme innovation. More on these emergent concepts will be covered in the discussion section of this and next two chapters.

4.3. Data supporting first order codes and second order themes

In this section I describe the first and second order themes through representative data. I layout the descriptions around the eight second order codes, themes or dimensions and describe each of the first order codes that addressed these second order codes. The second order dimensions served as analytical queries which helped to identify the third level theoretical abstractions. These groupings were 'by whom', 'for whom', 'for what', 'economic orientation', 'nature of solution', 'necessity' or 'ideational' based, and 'scalability'.

After each supporting quote the brackets indicate data source. For instance 2007S35 means information is from the 35th application form in year 2007. All application forms were

from shortlisted entrepreneurs. Other textual documents such as internal memos and full business plans were coded using for instance T1. Data from interviews was labelled using the nomenclature 38F which means this represents interview data from respondent 38 with F indicating it is a faculty or programme administrator member. Other respondents were marked as E for entrepreneur, I for investor, and M for mentor.

I. By whom

The second order category of 'by whom' came about after first order codes were coalesced into a common theme of who pursues or does the innovation. The four types of actors revealed as the sources of innovation were grassroot individuals, entrepreneurial actors, designers or engineers, and large firms.

1. *By grassroot individuals:* Although I am focusing on social entrepreneurs as a sample selection, they may not be the source or pursuers of innovation themselves as shown here in the case of grassroots actors. Entrepreneurs revealed grassroots individuals as often necessary sources of innovation. But the level of technology accessible to and used among grassroots innovators was less than optimal:

   "And the grassroots level entrepreneurs are still away to take the advantage of modern technology." (2011s15)

   And the entrepreneur(s) sought to provide this missing access to technology:

   "... and finally an institutional process will be emerged for scaling up grassroots entrepreneurs adopting ICT." (2011S15)

   A mentor described grassroot individuals as a source of innovations for solving their own specific needs. He described it in the Hindi word of '*jugaad*' as being limited to reusing existing resources for other originally unmeant purposes:

   "In India innovation is at the grassroots level as in the case of Jugaad, a term that denotes making do with whatever resources are on hand. One common practice is to reuse a water pump engine for another unmeant purpose like a rural van. Or like the clay fridge. So people are creative, however in an unstructured way." (36M)

An engineering student who partnered with the one of the visiting social entrepreneurs to help solve some of their engineering and technical concerns, described himself as coming from a rural farming, or grassroots background. Though not explicitly described, the narration implied the student was drawn to solving needs that his grassroots background helped him to appreciate:

"I come from a farming and rural background. When I attended a class on Climate Change for Social Justice the instructor mentioned frugal innovation and I was drawn to it and sought out this class." (38F)

2. *By entrepreneurial actors:* In this circumstance as opposed to the above theme of grassroots, the entrepreneurs themselves have an idea and take upon themselves to begin an innovation. I call these sources as "entrepreneurial" since they identify an opportunity and are risk takers in starting an innovation effort. A social entrepreneur and mentor at the programme described using his own example:

   "One such project I am working on is an ATM dispenser for medicines that ensures the authenticity of medicines and 24x7 availability." (2M)

   An organization which applied to the programme explained how it was too dependent on its founder or entrepreneur:

   "GGSA primarily represents the vision and mission of its founder and has been largely dependent on this one individual over the past two years." (2007s76)

   A faculty member from the engineering faculty described herself as being entrepreneurial given her first debut into (frugal) innovation as the first female faculty member. She explained how very few female students were enrolled and this was a way for her to make engineering more relevant and attractive to the female gender. She later described how she helped solve some of the most pervasive but overlooked problems in Silicon Valley:

   "I got involved in 'frugal' in the early 1990s when I was the first female professor at the engineering school here with very few female students." (40F)

3. *By designers***:** Designers or engineers in this case pursue innovation to take upon themselves something challenging. One entrepreneur alludes to his own background as product designer. Although he is motivated by the goal, but is also motivated by the opportunity to design for demanding customers in demanding environments:

"As a product designer I am motivated by the outcome, but driven more by the challenge to innovate for these demanding customer needs in these demanding environments." (51E)

Another individual who is both an investor and entrepreneur alludes to his background as an engineer to understand and recognize innovation as a challenge for designers:

"I understand frugal innovation from Radha's perspective on low cost, rugged, user friendly, and simple. As an engineer I recognize these are very challenging design criteria." (27I)

The following quote describes the importance of good designers to an applicant entrepreneur:

"(Challenge is) As organization grows, finding design professionals who believe in our mission of applying design for development purposes using renewable energy." (2011s19)

A mentor described the challenge for particularly Western designers as two folds – one cost reduction and two understanding the needs of targeted beneficiaries or users:

"And it is particularly hard for designers in West to accomplish this for developing world because of cost reduction impediments and inability to understand fully needs of those communities." (19M)

4. *By large firms:* A fourth first order category indicated large firms as a source of innovation. A mentor who served as top executive of a large corporation explained the potential for large firms to adopt the types of problems he sees among social entrepreneurs. He explained large firms can help solve some of these issues and in the process learn something valuable:

"As CEO of the company I ran, I would now go back and have a project team working on for instance cook stove combustion, not just to fulfil the need, or opportunity for profit, but to learn from new contexts and constraints". (41M)

One entrepreneur turned mentor, explained that given that *jugaad* connotes an unstructured process of innovation, in that form it is not pursued by large firms which instead pursue more structured processes of innovation marked by formal research and development. Although this shows how innovation is not done by large firms, it does show how social entrepreneurs view innovation as being pursued or rather, not pursued by, some actors such as large firms.

"However large firms do not use much of jugaad as it denotes un-sophistication and unstructured process of innovation. They do more of the formal RnD led innovation."(36M)

A programme organizer remarked that (frugal) innovation could be a determining factor on how successful a firm is in operating in developing or emerging markets. This implies for large firms to take on the types of innovation social entrepreneurs pursue:

"Frugal innovation may serve as a measure of success for a firm functioning in developing or emerging markets." (37F)

But the adoption of innovation activities by large firms is also seen as threat to the entrepreneurs' own activities given the resources available to large firms:

"Atlas Corps is also threatened by larger international organizations who could copy the Atlas Corps model and move more quickly based on their size, access to capital, and reputation." (2007S56)

II. For whom

This second order category suggests for whom the innovation is pursued, or the end beneficiary of the innovation itself. A recurring theme was that innovation was carried out for the needy, neglected, or simply the underserved. This 'for whom' theme was a cross cutting theme of serving the underserved or marginalized regardless of 'by whom' it was done.

5. *For underserved:* A entrepreneur described his firm's primary mission is to serve the underserved:

"Over 15 years CEMINA has been investing to provide educational content and skills to underserved communities through the use of radio." (2011s59)

Another entrepreneur succinctly described his mission as:

"Improve Lives of the Poor through Clean Energy." (2011S8)

A top level administrator of the programme explains the mission of the institution as helping the underserved through what he sees as frugal innovation activities at the programme:

"I see frugal innovation from the Jesuit perspective of helping the underserved. We have here engineering with a mission." (39F)

Towards providing expertise for this type of mission, a top level administrator of the programme writes in one of his memoirs that the needy people across the world not only should be served, but that the experience benefits education at the institution:

"The breadth of exposure and ability to ground a Santa Clara education in immersion serving the world's neediest peoples are invaluable. Our objective, and the objective of the capstone projects, should thus not be defined narrowly in terms of training students to work in conventional U.S. jobs." (T1)

III. For what

Here the second order theme addressed 'for what' primary purpose was the innovation carried out. The coding process revealed four reasons for innovation activities as exemplified in four first order codes: For solving needs, for social improvement, for cost leadership and competitive advantage, and for challenge.

6. *For solving needs:* An applicant tersely described his mission is to:

"Create sustainable solutions to help the needy." (2011S9)

And so does another entrepreneur mission which is to:

"Apply Information and Communications Technologies to bring lasting change to the world's neediest people. Lack of field penetration of ICT in relief, development and conservation NGOs." (2005s159)

The faculty member described above in second category 'by whom' (40F) who was entrepreneurial as a first mover in pursuing frugal innovation described the reasons for doing so. She explains that it was to solve needs of people who were underserved:

"I took them (students) to Housesafe near Santa Clara, a community programme for battered women and tried have my students solve some of their needs. And the women surprisingly contributed to creating the solutions. So inequities lie everywhere and relatively speaking the differentials are worse in Silicon Valley where the rich-poor divide is huge." (40F)

In the following quote, another faculty member explains that not only are social entrepreneurs exposed to working in developing markets, but also the faculty who eventually would mentor the social entrepreneurs so that the latter can be better informed of the needs of the beneficiaries:

"We send faculty every year to Africa, Nicaragua, and India and China to enable understanding of needs there." (39F)

7. *For social improvement:* This first order category is related to the one above on 'solving needs', but with a broader goal of not simply solving the needs of one or few individuals, but of improving a community or social concern. An entrepreneur wrote in his application form:

   "Bonergie aims to terminate poverty in BoP countries. We are no solar light vendor. We are developer of BoP markets in order to improve the life of people in poverty." (2011S29)

   And this is supported by another applicant entrepreneur's description:

   "Envirofit's technologies and approach are already demonstrating the potential for significant results in terms of job creation, income levels, environmental improvements." (2007s67)

   In the following quote, a teaching member explains in light of frugal innovation, that it is an outcome, implicitly greater than simply an ends for solving needs, that stems from a process of engagement with those an innovator seeks to serve. What this greater outcome amounts to, could include a social improvement:

   "My feeling is that frugal innovation is an outcome that occurs after you've engaged with the society you wish to serve in developing countries." (37F)

   Another teaching member describes the collective improvement through concerns such as sustainability in general:

   "Frugal innovation seems to solve problems of the poor by designing solutions for them. This means understanding their needs in those particular contexts. I am personally drawn to it (FI) for my interest in sustainability." (52F)

8. *For cost leadership & competitive advantage:* In contrast to the social improvement goal, although that may exist, the goal here was to protect one's leadership in the innovation. Writes one entrepreneur:

   "(We) customized an in-house management process to ensure competitive advantage." (2011s41)

   Another applicant writes about protecting their organization's technology:

   "A key component of our system is the control system, a micro-controller which orchestrates the flow of energy and maintains statistics about the usage of the system. Because it is

unique, it will prevent others from copying our technology so we can protect our investment." (2007s95)

The following passage by a programme lecturer indicated the link between efficiency, cost reduction or leadership, and subsequently competitive advantage. However, he warned that the focus should not be only on cost reduction but of several aspects that help to achieve a sustainable competitive advantage such as features and financing:

"Competitive advantage emanates from increasing sustainability, lower costs, most useful functions, market access, best value quality, and easiest to buy through financing options. Lower cost or price is easiest to achieve but does not allow for sustainable competitive advantage. The deeper you go in your business model to achieve other strategies, the more sustainable your competitive advantage becomes." (12F)

The notion of industrial efficiency was also revealed here. This hinted towards the third level aggregate dimension identified later. One social entrepreneur explicitly mentioned efficiency as the main defining feature of innovation:

"To me it (innovation) is about solving a problem in the most efficient manner possible." (46E)

9. *For challenge:* Challenge emanated frequently as a theme on why innovation was pursued. The idea was that traditional problems were routine and available to them off-the-shelf solutions. In contrast, innovation by social entrepreneurs or for problems that social entrepreneurs would be interested in resolving, pose interesting non-routine challenges to designers, engineers, and entrepreneurs. A top level executive wrote in his letter:

   "The unique experience of providing a viable solution to challenging concepts in difficult conditions and different cultures is noteworthy. This experience reinforces not only a spirit of service but the ability of an engineer to be innovative in approach while providing solutions to problems which might not be encountered in routine engineering." (T1)

   An entrepreneur wrote in support of the above:

   "Although ammonia absorption technology has long been used in industrial and commercial applications, how to use it with solar energy and for rural communities of developing nations has long been a technical challenge. The innovations that effectively met this challenge were developed by (omitted)-." (2006S133)

An engineer and entrepreneur turned mentor described that cost reduction, of the type encountered by social entrepreneurs, becomes exponentially more and more difficult and therefore challenging:

"As an engineer bringing 10% cost reduction is difficult with next 10% even more so and the next 10% even worse." (19M)

A teaching faculty member describes the benefits of the challenges that environments in which social entrepreneurs generally function in. These challenges are not limited to technology or cost, but of issues related to the whole ecosystem:

"And for the 'techie' students the frugal contexts present interesting challenges of different performance dimensions as well as an understanding of the whole ecosystem embodying engineering for humanity as opposed to just the role of technology." (40F)

IV. Economic orientation

The second order theme of economic orientation describes the economic motivation or goal of innovation. This is described in terms of profits. The first order codes that addressed this theme comprised of no profit motive, high profits, a hybrid mix of for profit and non profit, and a degree of reasonable profits.

10. *For high profits:* Since Hart and Prahalad (2002), there is a belief that multinational firms can profit from large untapped reserves of huge populations of bottom or base of the pyramid consumers. A top level administrator of the programme institution believes such experiences for students working in these markets can help international firms be more profitable:

"With multinational corporations noting that 70% of their growth will come from overseas markets, the corporate world now recognizes the immense and growing markets in serving people at the bottom of the pyramid. Thus students experienced in design in under-served regions will be in a better position to contribute to corporate market development." (T1)

Another respondent tells about his diversification strategy across all profitable sectors:

"I do not limit my endeavors to social products or ventures but rather a wide range of sectors like healthcare, energy, and cosmetics as long as they are deemed profitable. That is crucial to help sustain the business model in that particular context." (32M)

One respondent links cost reduction efforts to aims for profit increases:

"Cost reduction has been about greater profit margins for the company." (29F)

Similarly an entrepreneur explains how his/her technology paves the way for high profitability:

"Thus the Insulpanel System is an integrated whole, which offers for the first time a new building technology and the basis for a new and very profitable business operation." (2006S106)

11. *No profit motive:* However, while the bottom or base of the pyramid have been promoted as untapped profitable markets, an investor points out that that may not actually be true:

"Most funds did not care if the segment is rural or urban. But this is changing now given the rural BOP are 3X less wealthy in PPP than urban. There are now reports which warn not to expect to become rich from serving the BOP (nevertheless people still do)." (10I)

An entrepreneur explains there is little motive for profit:

"IDE is an international non-profit working to reduce poverty in rural areas in developing countries through facilitating increases in income generation." (2005s156)

And the above is supported by a student run social enterprise:

"Our innovation extends beyond our basic business model of information dissemination and fundraising (a non-profit, student-run deli) into our method of communication." (2007S70)

12. *For profit / non profit:* This is a hybrid structure that draws upon both for profit and non-profit economic orientations. As in the case of a social venture that draws inspiration from the Aravind eye hospital, it seeks to make enough profits to not only subsidize free services for the underserved, but also generate returns for founders and investors:

"A major difference b/w Salauno and Aravind is that we are for profit. But we believe we can make enough surplus to do free eyecare for low end and yet still make profits for our founders and investors." (44E)

And entrepreneur explains how they envision putting together a hybrid structure involving both for profit and non profit:

"We hope to emulate the crowd-sourcing, profit-yielding concept of Threadless.com and combine it with the narrative drive of Invisible Children; the social-benefit, fundraising engine of TOMS Shoes with the poverty-eradicating practices of Kiva." (2011S22)

An investor recalled the use of hybrid investing that leverages both social enterprise investment but also regular mainstream investing:

"I use a hybrid model of investing because the rate of return in social enterprises is very low and takes a long time. So I make up for the delay in financial return through regular investing." (50I)

13. <u>*Reasonable profits:*</u> Other social entrepreneurs suggest that for profit economic orientations should seek to spread out profits more reasonably for everyone involved in the value chain:

"A challenge is how we move away from maximum margins to <u>reasonable</u> margins for all in the value chain." (30E)

Unreasonable profits on the other hand are described as unethical to pursue:

"As we are a fair trade business working out of an African economy we cannot afford high Western marketing costs. To achieve such costs would mean we would have to add unethical profit margins." (2005s148)

Another described they are different from the prevailing price inflationary practices:

"Mineral water and safe water retail prices are artificially inflated with un-necessary quality labels and standards." (2011s21)

But then another entrepreneur explained that profits should be not only be reasonable in terms of end price but also to afford attractive margins for those involved in value creation:

"IDEI promoted drip technology incorporates the following: Attractive trade margins to attract enough manufacturers and dealers and ensure sustainable market development for the systems." (2006s125)

V. Nature of solution

As with diversity in the range of economic orientations, I found that the nature of solution ranges from simply making do, good enough, to surpassing expectations and even radical or breakthrough improvements.

14. *Making do:* The limits imposed by the amount or type of resources one has or controls suggests one may need to make do with what is on hand. A social entrepreneur explains this based on how frugal innovation overcomes such constraints:

    "Frugal innovation is about overcoming constraints such as resources to make do with what one currently controls." (4E)

    The following narrations show making do through improvisation and using spare parts for purposes other than those the spare parts were originally designed for:

    "Solar concentrators are commonly used in developing world countries, but no one has combined them with ubiquitous car engine parts to create affordable electricity and refrigeration in addition to heat. Imagine if you could take components from a car engine (pumps, alternator, turbocharger) and recombine them in a new way to create a simple turbine. Add to it a source of free fuel, the sun, and you get a clean, sustainable and inexpensive energy source which could generate hot water, electricity and refrigeration for community centers, clinics, schools and small businesses in poverty stricken areas where there's limited access to energy sources, but plenty of access to the sun." (2007s95)

    The above improvisation in making do is supported by another entrepreneur:

    "Three years later this device helped the family increase income generation and the family did all the kinds of financial and technological improvisations to assure the device was sustained and maintained. They initiated advance service agreements and used spare parts not originally designed for it (the machine or tool)." (23E)

    A negative side of this make do strategy was also revealed and that these solutions would not be allowed in the West. In the Peruvian mountains, humans and goods are transported quickly over a network of sliding baskets on cables that connect mountain peaks. This practice is a dangerous 'make do' solution which would not be acceptable in the more regulatory and safety conscious environments of the advanced markets:

    "The flying villagers as in Peru are an example of jugaad. That kind of practice would never be allowed here in USA." (20F)

15. *Good enough:* Some solutions were described to be simply good enough for the intended purpose. A corporate engineer turned social entrepreneur narrated how Intel learned about the

benefit of good enough solutions from social enterprises such as the One Laptop per Child of MIT's Negroponte:

"What we (at Intel) learned from impending competition from OLPC was to redesign the processor for low cost netbooks with good enough performance. So yes the West can learn from technology application in developing countries." (4E)

In the same stream, a mentor and administrator of the programme explains losing sight of good enough solutions in the pursuit of sophistication:

"It is all about common sense and de-sophistication. Recall the NASA ball point pen for $5m versus a $1 pencil." (8F)

An entrepreneur explains the pursuit of satisfactory solutions in their case:

"A key innovation of Build Change is the PROCESS for post-disaster housing reconstruction programs that produce safe, satisfactory, and sustainable houses." (2007S58)

16. *Surpass expectations:* In contrast to good enough, some respondents viewed innovation as surpassing expectations of users, clients and even of founders. An entrepreneur described his/her mission as:

"Deploying multidisciplinary expertise in exceeding customers' yearnings and marketplace expectations." (2011S39)

The Aravind eye hospital views exceeding of performance in terms of the scale they wish to achieve. An expert and close associate of the hospital narrates the challenge of design not for a portion of the market segment, but for every market segment:

"At Aravind we are talking about design not for the 1% or 99%, but for the 100%." (33M)

She goes on to explain that this self imposed constraint has to be at a higher than normal level, for if the expectation is not higher, then their solutions cannot be differentiated from the competition:

"So the self imposed constraints have to be at a higher level than the norm, otherwise your solutions will be the same as everyone else's." (33M)

An entrepreneur described how BOP consumers are not looking for cheap solutions but instead are rather demanding in their expectations:

"BOP customers are actually pretty demanding and rather sophisticated in recognizing what is more high quality and aesthetically expensive looking in their choices. And this is part of the challenge for designers in the North innovating for the BOP in South." (23E)

The following describes how expectations of both consumers and designers have to be surpassed given the frugality concerns of consumers:

"In reality frugal innovation may actually be very expensive to do for entrepreneurs. It is something they have to do when they face frugal consumers. Say for instance Lifeline technologies, has turned out to be very robust and expensive. And the same thing with D. Light." (37F)

17. <u>*Radically improve (some performance dimension or lower cost):*</u> An incremental increase in performance or reduction in cost is not what some entrepreneurs deem would be sufficient to innovate for the contexts they function in. A radical cost reduction or improvement in performance or both is suggested. An entrepreneur explained how he/she believes their offering is the best performing along several dimensions:

"Its portability empowers those working in remote areas and allows the demolition of rock or masonry in almost any location <u>with a level of safety, economy and precision not available from any other system we are aware of</u>." (2006s110)

One mentor believes a radical cost reduction is needed if one wishes to serve the base of the pyramid:

"I told GE that 10-15% cost reduction as being talked about means they are not serious in addressing the BOP. <u>Instead they need a 10 fold decrease</u>." (2M)

Another member explained that the expectations have to be met not only in terms of affordability, but also in quality that uses leapfrog technologies:

"Frugal innovation is about <u>jumping or leapfrogging</u> alternative solutions to use high tech and high quality but at affordable levels." (43F)

VI. Necessity based

This theme describes the logic behind the need to innovate. One need that was identified arises from the unavailability of an attainable solution and the other from the need to stay ahead of competition.

18. *No attainable solution:* For many of the problems these social entrepreneurs were looking at, there existed any solution. One entrepreneur said the technology wasn't discovered yet:

    "There is no proven technology to arrest this rat menace." (2005s145)

    So another entrepreneur explained he/she needed to come up with solutions for problems that weren't figured out yet:

    "Devise self-sustainable solutions to problems that have eluded solutions in the past." (2007s57)

    A programme member described that solutions are often not designed to be suitable for the problems many of the social entrepreneurs are solving. That is, the solutions are not available where the problems are situated. Innovation is needed to overcome this limitation to provide a solution that meets specific problems:

    "It isn't that easy to do perhaps because the solutions are not suited or amicable to where the problems are." (34F)

    Another entrepreneur wrote they have no competition as no one else was looking to provide a solution:

    "We do not compete against anybody. It is a BOP high education market not attended to by any public or private university." (2011s45)

19. *Stay ahead of competition:* In contrast to the above where there is no competition, here it was about beating the competition. The following quote further sheds light that innovation by large firms, whether to surpass or exceed expectations or come up with good enough solutions, is motivated by the need to stay ahead of competition:

    "I used to work for Intel in USA and here (USA) it is about exceeding requirements with focus on sophistication. At Intel we outpace many of the technological features for use by consumers. However the Intel Atom processor was a change of mindset brought about by competition from OLPC. We redesigned the processor for low cost and good enough performance for netbooks." (4E)

    An entrepreneur described the importance to them of staying ahead of competition:

"We will need to establish alliances overseas in order to remain competitive in a global overview. (There is) Very high level of competition that requires greater investments." (2011S26)

VII. Ideational based

This theme, like the theme of necessity based, describes the logic behind the need to innovate. But this is focused on a visionary or ideational motivation such as to rectify inequity or to come up with design breakthroughs.

20. *Rectifying inequity:* An Aravind hospital expert explains that they make no distinction among the different market segments they serve, and should they do so, their business model fails:

"The services for the poor are not marginalized in a separate unit, rather integrated to the extent that if the poor are not served, then the Aravind system breaks down for all." (33M)

Similarly, she explained that the setting up of laboratories for the production of intraocular lenses also stemmed from the desire to make available high end lenses to the poor:

"Frugal innovation is one done under constraints. In Aravind's case it isn't just contextual constraints but also self imposed constraints that are drawn from values of the founders and the firm… Aurolab was initiated because we wanted the poor to have the same high end lenses, so it was a major contribution but not alone." (33M)

The head of the host institution wrote that the solutions their students develop stem from a motivation to achieve social justice.

"Several of our Senior Design projects involve a social justice component which we implement through engineering solutions." (T1)

And an entrepreneur explained the focus on removing poverty differentials that hinder opportunities for all:

"Fundamentally, we see extreme poverty as the ultimate source of vulnerability that must be shattered to ensure that opportunity and freedom flourish." (2011s22)

21. *Design breakthroughs:* Here the idea is that design breakthroughs are necessary if one wishes to solve the visionary or ideational problems social entrepreneurs seek to resolve:

"Most people try to do disruptive innovation through standard constraints as opposed to self-imposed constraints. But recall Einstein that the same level of thinking cannot solve problems that created them in the first place." (33M)

Along the same lines as above, an entrepreneur explained that incremental improvements cannot be relied upon to resolve the issues and achieve the goals that social entrepreneurs wish to achieve:

"Here they rely on Moore's law to increase performance and lower prices. However in areas where I function, you need to do more than just that." (51E)

And another entrepreneur described their goal of coming up with breakthrough technology:

"We believe our approach of global R&D in a combination of wealthy countries and developing countries is the key to continuing to provide new breakthrough clean technologies to the customers that frequent the small shop in emerging markets." (2011s11)

VIII. Scalability

This last secondary theme embodies the degree to which scalability is a concern for social entrepreneurs. It ranges from little or no ambition to scale to having a high ambition to scale and from generating a proof of concept to delivering high scalability.

22. *Little scaling:* The responses below describe little ambition for scaling from the perspective of *jugaad*, which in the first theme outlined above was associated with grassroots innovation.

"Jugaad is limited to grassroots with little entrepreneurship and ambition for scaling." (36M)

A programme lecturer and social entrepreneur herself describes the negative connotation of jugaad as another hindrance to its adoption and scalability:

"Jugaad is not acceptable in India among corporations and even among villagers. If you say this is a jugaad water filtration device, the villagers will not use it." (21F)

And in relation to grassroots source, there is less likelihood of scalability:

"Like a lot of "grassroots" organizations, we grew out of passion, not out of a rational plan to create an organization that will last. But, obviously, passion can only carry you so far. So, we must now focus on sustainability and organizational stability." (2007s81)

23. *Ambition to scale:* But despite an awareness of the challenges or obstacles to scalability, other entrepreneurs conveyed a desire or ambition to scale:

"Nevertheless, we do wish to reach out to more people and do much more than our current programmes and improve our systems." (2007s69)

And in another instance, there is a clear understanding of what is needed to achieve one's scale ambitions:

"With Hapinoy's growth ambitions, building an Organization and System alongside with the growth become necessary pillars for future expansion and scale." (2011s37)

The narration below shows how a mentor suggests social entrepreneurs can strategize using partners to potentially scale up:[11]

"In a mature developed market you can use retailers like Walmart and Amazon to sell multiple products to many customers. However in developing economies you instead need to partner with intermediaries to focus on a use case, gain large 'shadow effect' then replicate to scale in these markets. (26M)

The Aravind hospital describes how they wish to attain high scale not only for themselves but for others too:

"On learning from us, we do 300K surgeries a year and have enabled others to do another 1 million a year." (33M)

The following excerpt shows how one member believes social entrepreneurs can exhibit a scaling up potential through exhibiting a reduction in cost per outcomes:

"Cost per outcomes are an attempt by social ventures to be more financially relevant to investors. Reducing the cost per outcome also exhibit scaling up potential since one can do more with little." (1F)

24. *Proof of concept:* Some social entrepreneurs see innovation for establishing proofs of concept, as explained by an entrepreneur and mentor:

[11] This is supported by Desa (2009a) who finds that collective agency in which there is the participation of external actors in the development of the venture is crucial for the ability of ventures to scale to new markets.

"I use design thinking to setup new microfranchise businesses such as ideation and prototyping, microlight marketing, and quick and dirty proofs of concepts." (32M)

And a similar quote from entrepreneur tells us:

"The aim of our activity is to demonstrate that it is possible to make profits from waste and hence attract private sector participants into the industry. We therefore hope to attract other investors by demonstrating and replicating a successful model." (2006s118)

The following quote describes how an investor looks for social entrepreneurs to innovate and exhibit a model that can be referenced or replicated:

"As an investor I would look for a focused referenceability model that achieves scale in developing economies." (27I)

25. *High scalability:* Along the above line of thought, a mentor, thinks social entrepreneurs, like entrepreneurs, are good at proving new ways of doing things. But he goes on to say that to go beyond this proof of concept, large firms have to be brought in to achieve high scalability:

"I think social entrepreneurs are the same as entrepreneurs. Social entrepreneurs are good at experimenting and exhibiting proofs of concepts. However large organizations are good at scaling. But this is no different from regular silicon valley entrepreneurial models where small firms are sold to large ones. What is different though is the IRR from these ventures." (41M)

A fellow mentor corroborates this idea by believing that soon several successful proofs of concepts by social entrepreneurs will be acquired by large firms which would in turn be good for achieving high scale:

"Soon you will see companies like eHealth and Husk Power will be acquired by MNCs. This would help achieve scalability goals as MNCs are good at replicating what works well." (2M)

An entrepreneur describes the effort to keep high scalability in sight for all innovations:

"The innovations were meant to be replicable right from the start. If an innovation cannot be economically replicated, we discard it." (2011s57)

4.4. Aggregating into third level theoretical concepts

My analysis as outlined in the preceding section enabled me to identify several first order codes around second order issues of by whom, for whom, for what purpose, through what motivation, to what degree, all of which help to constitute the different perceptions of innovation I reveal. In the fourth and last stage of the coding and analysis, the objective was to take the first and second order codes outlined above with supporting data quotes, and label them with theoretical dimensions based on emergent concepts or on existing ones found in the literature. I did so by comparing the second order dimensions across the first order codes shown in table 4.4. I placed the second order codes in rows and looked for third level concepts across the columns.

By using cross indexing and building relationships across passages and first order themes, and iteratively reconfiguring the first order codes across from one column to the other, I came up with the final version of table 4.4 shown. Column-wise first order codes coalesced into the third level theoretical dimensions which are based on existing literature. These are user-based innovation (Von Hippel 1986; 1988; 2003), efficiency-based innovation (Immelt et al 2009), social based innovation (Nicholls and Murdock 2011), and challenge based innovation (Diamandis and Kotler 2012). I shall discuss these four perceptions among social entrepreneurs of innovation in the discussion section 4.6.

4.5. Generating the theoretical model

One of the objectives of this research is to help create models of innovation as perceived by social entrepreneurs. To do this, I again found table 4.4 very useful. Upon reviewing this intermediary table, I noticed that a common feature among all four categories

on innovation among social entrepreneurs includes ‘for underserved’ consumers. They were underserved either due to market failure whereby the market can’t reach or make it affordable enough or due to technology failure whereby the technology is not designed for those users. Also from this table, I identified two dimensions where “no data” existed among half the categories. This helped distinguish the categories into two groups. I say two groups because there was data for half of the four third level theoretical themes. One dual grouping arose from necessity or ideational based and another dual grouping arose from proof of concept or high scalability. I used these two dimensions, one on the logic of need and another on scalability to build a theoretical model of innovation as shown in the 2 X 2 matrix in figure 4.3 which captures all four third level codes.

<See figure 4.3, page 143>

4.6. Discussion

The findings outlined in this chapter allow me to make a distinct theoretical contribution, specifically to broaden the understanding of innovation among social entrepreneurs beyond that of the popularly assumed social innovation. In chapter 6 I outline this contribution in detail and offer avenues for future research in chapter 7, but I provide a prelude to that discussion in this section.

Weerawardena and Mort (2006) developed a bounded multidimensional model of social entrepreneurship based on grounded theory method and drawing on nine in-depth case studies. Similarly, I view innovation models by social entrepreneurs as configurations that are ‘multidimensional constellations of conceptually distinct characteristics that commonly occur together’ (Meyer, Tsui and Hinings 1993, p. 1175). To identify these 'distinct characteristics', I reflect on how social entrepreneurs think about innovation as they perceive their experience

and practice of innovation. Literature on social entrepreneurship attributes social innovation to social entrepreneurs without clearly explaining what is social innovation (c.f. Mulgan et al. 2007a;b; Phills et al 2008; Pol and Ville, 2009; Minks 2011; Nicholls and Murdock 2011).[12] I instead find that social entrepreneurs do not see one type of innovation such as social innovation, but rather draw upon various types already found in existing literature and practice. The evidence signals that the social entrepreneurs in this study agree to disagree that they are purely social innovators. The question then arises, "what innovation is it that they coalesce around?" In this sample the social entrepreneurs have brought up emerging concepts such as inclusive, *jugaad*, and frugal innovation which suggests there are efforts to delineate a blend of existing innovation approaches.

My findings suggest there are differences across the logic of justification that social entrepreneurs rely upon in viewing innovation models. The social-based type is associated with the civic principle, the user-based type with the domestic principle, the efficiency-based type with the market principle, and the challenge-based type is associated with the fame principle. The civic principle seeks to create value by solving communal or society wide concerns. The domestic principle seeks to create value for localized problems by and for users. The market principle seeks to create value through greater efficiency, improved productivity and with enhanced operational effectiveness. And the fame principle seeks to create value by solving challenging problems no one else has been able to do so.

My interpretation of the four types of innovation enables me to create a typology of innovation models using proof of concept or high scalability and necessity or ideational based

[12] Perhaps the lack of coherency around what is social innovation explains some of the diverse views on innovation.

motivations. The four innovation types within the model imply that innovation as perceived by social entrepreneurs is associated with different principles of judgement around what is valued -- solutions by and for users, solutions to increase efficiency for firms, solutions to surmount challenges or solutions that achieve a social goal for communities. These principles justify the pursuit of one or a range of these types of innovations as perceived by social entrepreneurs to serve the underserved or marginalized segments. I am therefore able to formulate the following propositions from these findings:

> *Proposition 1: Innovation for the underserved or the marginalized ranges from needs based to ideational.*
> *Proposition 2: Innovation for the underserved or the marginalized draws motivation from social opportunity at one end to economic opportunity at the other end.*

Given that social entrepreneurs see and practise diverse perspectives on innovation, beyond that of simply social innovation, what other concept might encompass the varying perspectives revealed herein? As revealed in the *in vivo* texts from the data drawn from this sample of social entrepreneurs, this concept is labelled as frugal innovation. This came up sporadically in the workshop activities, observations and discussions. The notion of frugal innovation is also explicitly reflected in the adopted name of the newly setup Frugal Innovation Lab at the host university. The potential for frugal innovation as a new concept according to the respondents is promising.

The vision of a new emerging concept of frugal innovation can be related to theoretical concerns of intra and inter organizational divisions of labour, organizational design, networks and collaborations and the transcendence of organizational boundaries. For instance in terms of organizational boundaries, social entrepreneurs are seen as mainly social innovators and business entrepreneurs and firms seen as mainly technology innovators.

Through a common focus on serving the underserved, whether for profit or social improvement, both are adopting the concept of frugal innovation (c.f. Bhatti, Khilji, and Basu 2013; Govindarajan and Trimble 2012; Radjou, Prabhu, and Ahuja 2012) as a common converging ground that transcends and reconciles the different motivations and approaches between the two communities. While social innovation is seen as the other extreme of business innovation, frugal innovation serves as a bridge to bring business into the activities of social entrepreneurs and to bring social into the activities of corporations (e.g. GE and Tata). This is depicted in figure 4.4.

<See figure 4.4, page 144>

So I propose:

Proposition 3: While social innovation is seen as the other extreme of business innovation, frugal innovation serves as a bridge to bring together disparate notions of innovation. It helps bring business into the activities of social entrepreneurs and to bring social into the activities of corporations (e.g. GE and Tata).

Proposition 3a: Frugal innovation is an attempt by social entrepreneurs to bring social innovation within the sphere of business environment (socially based).

Proposition 3b: Frugal innovation is an attempt by business to bring traditional Schumpeterian innovation practices to suit local challenges (efficiency based).

Proposition 3c: The two attempts are converging towards a common boundary object labelled as frugal innovation.

To understand what might hold together the supposedly varying forms of innovation into a single concept of frugal innovation, I interpret the varying perceptions of innovation as depicted in matrix model in figure 4.3 into a holistic picture of what innovation means in terms of frugal innovation. I found among this sample of social entrepreneurs there are commonalities that bind all these notions of innovation together. The common cross cutting theme that provided some holding together of the different conceptions of innovation, was the

focus on resolving the needs or aspirations of the disadvantaged, disenfranchised or marginalized segments of society – the underserved, such as the base of the pyramid.

To better understand the myriad perceptions divulged above, I look through three theoretical lenses – the functional, process, and institutional lens. I find through this analytical step that there are common concerns that bind all these notions of innovation together for this sample of social entrepreneurs. The higher abstractions divulged through the three lens show that innovation is a set of ideas that can be identified together. I use the functional lens for each of the types to show how each of the four differ. But then I use the process and institutional lens to show, despite the differences, how the four recombine towards a common approach and objective. This is summarized in figure 4.5.

<See figure 4.5, page 144>

I begin with the functional perspective. From a functional perspective, innovation, or specifically frugal innovation for social entrepreneurs, focuses on how the outcomes are used and for what purpose. For instance it may mean to satisfy unmet needs (user based), become more efficient (efficiency based), solve social problems (social based), or solve wicked problems for underserved markets (challenge based).

> *Proposition 4: From the functional perspective, frugal innovation focuses on how the outcomes are used and for what purpose.*

4.6.1 Social-based

Nicholls and Murdock (2011, p.2) define social innovation as "the production of new ideas and new structures (Scott 2008) and a process of recontextualisation within socially (re)constructed norms of the public good, justice and equity." From the empirical findings

presented above, this type of innovation approach is primarily focused on an ideational vision for social improvement with aspiration for high scalability. Though not limited to, this approach can be best understood to occur at the community level of analysis. Under a social-based functional perspective, frugal innovation is social-based to solve problems and create value for society. In the integrative discussion of chapter 6, I describe three case examples, the Aravind eye hospital, Narayana Hrudayalaya cardiac hospital, and Grameen bank as reflective of this social-based approach to frugal innovation.

> *Proposition 4a: From the functional perspective of social innovation, frugal innovation is ideational to achieve social improvement with aspiration for high scalability.*

4.6.2 Efficiency-based

I draw from the work of Porter (1998b) to define efficiency-based innovation as one focused on attaining cost leadership based competitive advantage. Based on the empirical findings presented above, this type of innovation approach draws from the need to generate profits and to achieve high scalability. Though not limited to, this approach can be best understood to occur at the firm level of analysis. Under this efficiency-based functional perspective, frugal innovation is efficiency focused to achieve cost leadership as a competitive advantage. In the integrative discussion of chapter 6, I describe two case examples, General Electric and EasyPaisa as reflective of this efficiency-based approach to frugal innovation.

> *Proposition 4b: From the functional perspective of efficiency-based innovation, frugal innovation seeks to achieve cost leadership as a competitive advantage by generating high profits through low cost and high scalability.*

4.6.3 User-based

I define user-based innovation based on the work of Von Hippel (2008) as drawing from user needs and innovated by users themselves. Based on the empirical findings in this chapter, this type of innovation approach is primarily focused on solving personal needs with little or no aspiration to profit or scale from the innovation. Though not limited to, this approach can be best understood to occur at the individual level of analysis. And under a functional perspective, frugal innovation is user-based to generate solutions to personal needs otherwise not met by the market. In the integrative discussion of chapter 6, I describe the Mumbai Dabbawallas case example as reflective of this user-based approach to frugal innovation.

> *Proposition 4c: From the functional perspective of user innovation, frugal innovation solves personal needs of users by users with little or no aspiration to profit or scale from the innovation.*

4.6.4 Challenge-based

Diamandis and Kotler (2011) in Abundance: The future is better than you think describe how people come together to take on the challenge to solve seemingly unsolvable or wicked problems. Kay (2011) studies the the Ansari XPrize and the Northrop Grumman Lunar Lander Challenge in order to determine the effect of inducement and challenge prizes on innovation. Based on the empirical findings in this chapter, this type of innovation is taken upon as a challenge to develop radical cost performance improvement for various social, economic, or technological goals. Given these interdisciplinary goals, though not limited to, this approach can be best understood to occur at the sectoral level of analysis. It is ideational on proving inclusive outreach by exhibiting proof of concept for a challenging concern. Under this challenge-based functional perspective, frugal innovation is challenge and prize

based to radically improve an offering for consumers, such as price-performance points of existing solutions. Kay (2011) finds the introduction of novel R&D inducement approaches is associated with the participation of unconventional entrants. Support for this previous work is found in this work since I find that challenge based innovation draws the interest of a wide range of actors. In the integrative discussion of chapter 6, I describe four case examples, the Tata Nano car, Space X prize, One Laptop per Child, and Tata Nano car as reflective of this challenge-based approach to frugal innovation.

> *Proposition 4d: From the functional perspective of challenge-based innovation, frugal innovation is ideational on proving inclusive outreach by exhibiting proof of concept for a challenging concern.*

4.6.5 Tying the four together into frugal innovation

I have shown above how the four perceptions of innovation both differ and coalesce into a common understanding. Serving the underserved was a common theme that cut across all four innovations divulged in these findings. But the varying perceptions of innovation show that social entrepreneurs are concerned both about technical uncertainty and market uncertainty. By merging these two understandings, we can interpret that innovation as perceived among social entrepreneurs' signals the provision of solutions (products, services, distribution, business models) for underserved or marginalized consumers who face market or technology failure.

If potential products and services target current markets, they face only technical uncertainty. If they target outside current markets, then they face both technical and market uncertainty. The former embodies capabilities, performance and interdependence with other parts of the current system while the latter embodies building a new system that considers

usage preferences and benefits to consumers. In summary, innovation among social entrepreneurs can be construed as an effort to overcome market or technology failures to create inclusive markets. The goal of creating inclusive markets and the challenge of creating value through the interdependence between technical and market uncertainty merits a consideration of the whole value chain in the design and reconfiguration of solutions. Consequently, I argue that the functional perspective of frugal innovation outlined above can be merged into a process perspective where frugal innovation is viewed as a set of tasks or actions to redesign products and services and reconfigure value chains to create value for inclusive markets.

> *Proposition 5: From the process perspective, frugal innovation is a set of activities to redesign products and services and reconfigure value chains to create value for inclusive markets.*

My findings also suggest that the efficiency-based and challenge based innovation are characterized by producer, supply side, or push factor (Geroski 2003). The user-based innovation and social-based innovation are characterized by demand, consumer side, or pull factor. Social-based innovation can stem from both supply side and demand side. Over the last fifty years changing logics of development have shifted from supply side handouts and technology transfer to more demand side building of capabilities and technology adaptation. The sources of change have also shifted from state and philanthropic sponsored development agencies to market driven entrepreneurs and MNCs and community led civic groups. This is reflected in the four perceptions of innovation identified from the social entrepreneurs and supported by the following interviews and document analysis:

"I don't agree with handout models like Solvatten selling expensive solutions to NGOs and donors because it isn't sustainable. At Nazava we believe in the market and selling directly to the consumer." (22E)

"The World Bank and such international organizations aren't doing enough, in fact they put strings such as privitization to basic human rights such as water, which isn't right. Entrepreneurship for such challenges is the path for charity and grants cannot be sustainable." (49M)

"IDEI strongly believes that a market mechanism is the most effective and sustainable way to deliver affordable irrigation technologies to the targeted small-holder farmers. In keeping with this belief, IDEI facilitates the development of a localized, decentralised commercially viable Supply Chain to enable the manufacture, distribution, retail and installation of drip kits to small-holder farmers even in the most remote locations. The systems are both pre-assembled and customized, each unit packaged in a way to make installation and use convenient for the smallholder producers. IDEI's delivery mechanism for the technology is based on market-creation through the building of a commercially viable supply chain of manufacturers, distributors, dealers, retailers and installer. This innovative market-based enterprise development mechanism can be adapted for replication worldwide." (2006s125)

""And we believe that careful attention to design can create innovative -- and extremely affordable -- solutions to the problems of the other 90 percent." In other words: treat the poor as customers, not charity recipients." (B11F online quote, research site B)

Some perceptions draw from a market principle that sees an economic opportunity while others draw from a civic principle that sees a social opportunity. The findings suggest that the eclectic mix of needs driven individuals, challenge driven network of individuals, efficiency driven corporations, and socially driven individuals, organizations, and communities are all working to overcome development shortcomings of the past.

Therefore from an institutional perspective, frugal innovation can be viewed as a purposeful systematic change on how development can be best achieved within specific social contexts. This contributes to it developing as a new field.

> *Proposition 6: From an institutional perspective, frugal innovation is viewed as a purposeful systematic change on how development can be best achieved within specific social contexts.*

Figure 4.5 summarizes the interpretation of frugal innovation outlined here. In chapter 6 I discuss how the emerging concept of frugal innovation relates to similar themes found in the literature such reverse, grassroots, *jugaad* and inclusive innovations.

4.7. Summary

I gathered data on how social entrepreneurs perceive about innovation and said they do. So my findings rely on this narration of perceptions and implementation as opposed to what social entrepreneurs 'really' do on the ground. But since the objective of this research is to generate models of innovation from the perspective of social entrepreneurs rather than benchmark practices or processes, a reliance on perceptions and narration was deemed appropriate to achieve this outcome.

The findings and discussion in this chapter suggest that social entrepreneurs vary in how they view and justify innovation. I show that innovation among social entrepreneurs is not limited to social innovation. This finding is valuable for any future research that assumes, as in prevalent literature, social innovation to be associated with social entrepreneurs. This

study suggests that a sole focus on one type, mainly social innovation, in the existing literature needs to be assumed with greater suspicion. Further there is evidence to suggest that a new innovation field, that of frugal innovation, is emerging from the varying logics, motivations, and approaches divulged in this chapter.

In the next chapter I outline analysis and findings that address the next two sub research questions: How do social entrepreneurs conceptualize innovation under 2) institutional voids and 3) resource scarcity?

Figure 4.1: Screen shots of hand written notes with first pass on analysis

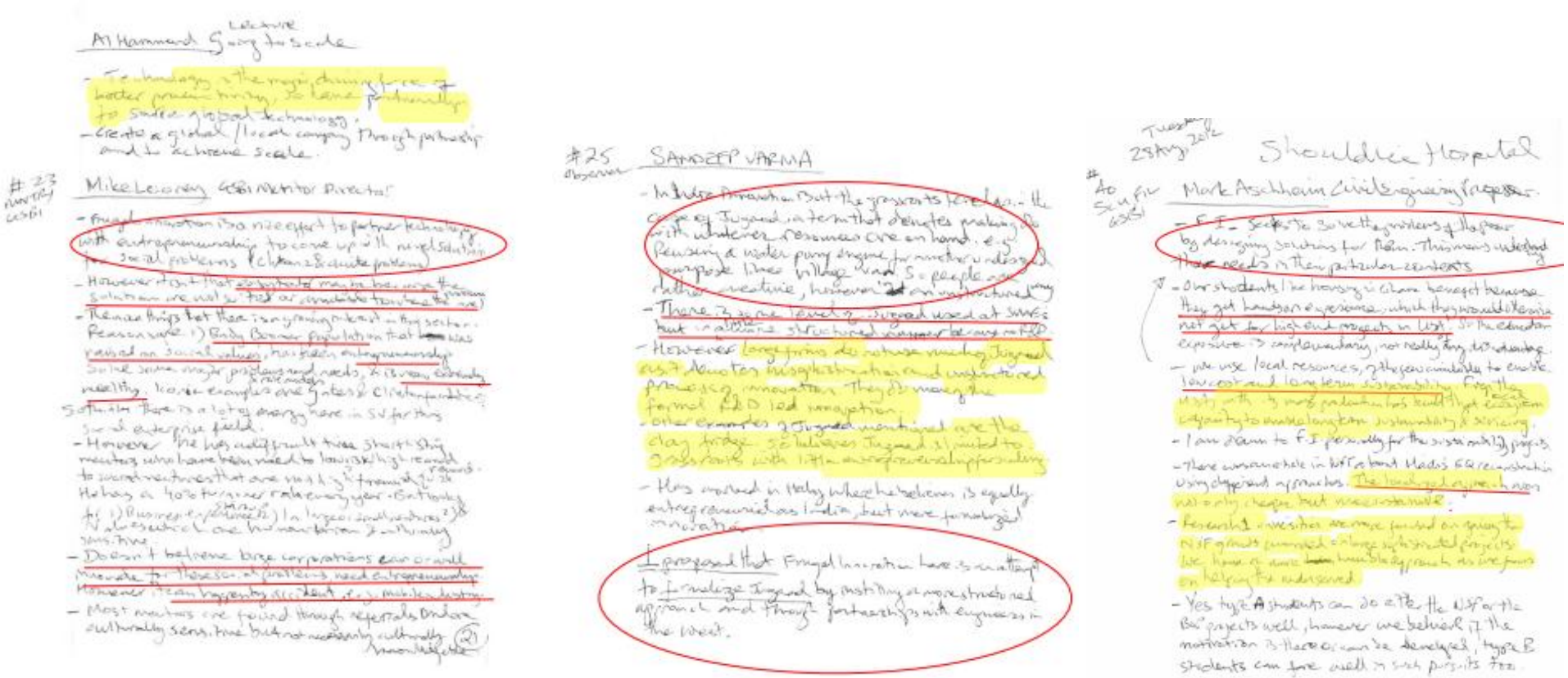


Figure 4.2: Coding sequence for question 1

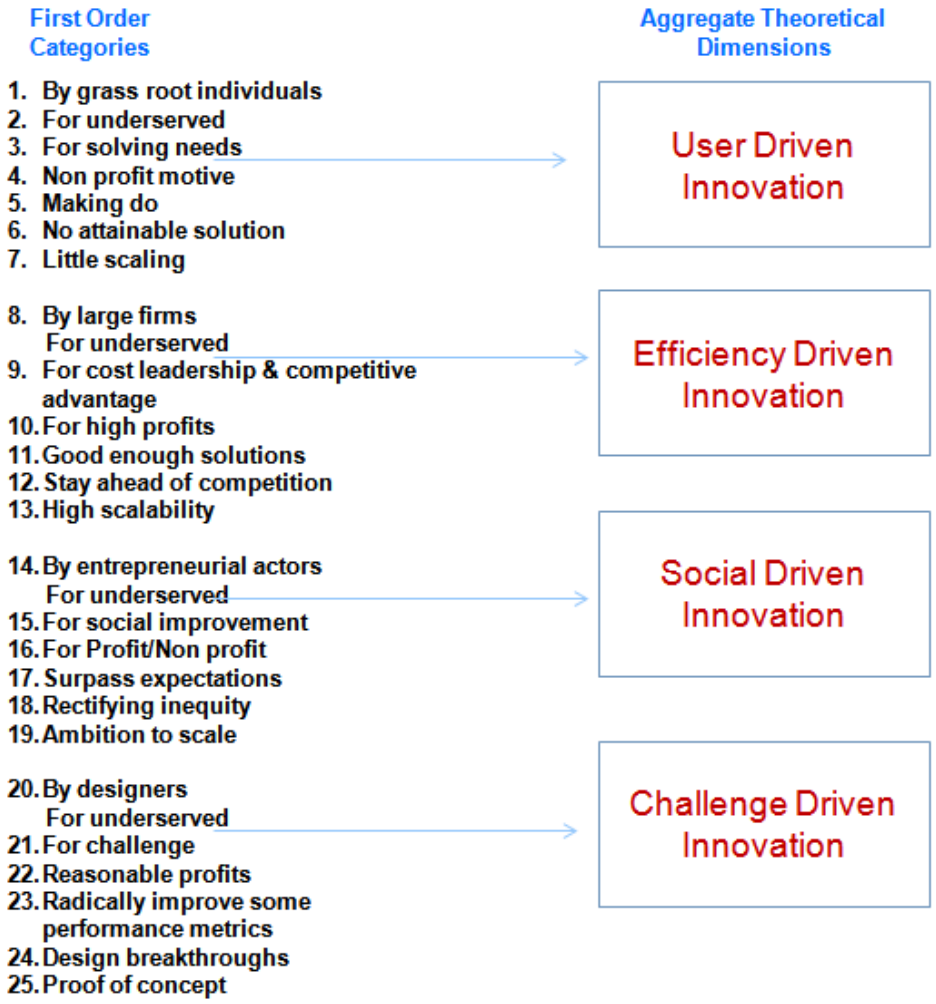


Figure 4.3: Model 1 -- Matrix model of perceptions of innovation

Scalability	**Efficiency-Driven Innovation** **FIRM LEVEL** Efficiency and financial bottomline focused, large firm and MNCs centric, with ambitions for cost leadership based globally profitable competitive advantage *e.g. "Reverse' innovation strategies by GE, TATA, EasyPaisa, Haier* (Govindarajan and Trimble 2012)	**Social-Driven Innovation** **COMMUNITY LEVEL** Socially beneficial, entrepreneurial, with ambitions to scale but not necessarily profit from it *e.g. Aravind, NHH, Grameen Microfinance, BRAC* (Nicholls 2006)
Proof of Concept	**User-Driven Innovation** **INDIVIDUAL LEVEL** Grassroots, need based, mostly individual based, little ambition for profit or scale *e.g. Local 'jugaad' applications, Honey Bee Network, Mumbai Dabbawallas* (Von Hippel 2005)	**Challenge-Driven Innovation** **SECTORAL LEVEL** Challenge focused for radical cost or performance improvements, entrepreneurial & network enabled; various social, economic, technological goals *e.g. X-Prize, $300 house, OLPC, Tata Nano* (Diamandos & Kotler 2011)

Necessity based © Yasser Bhatti 2012-13 **Ideational based**

Figure 4.4: Bridging social and business through frugal innovation

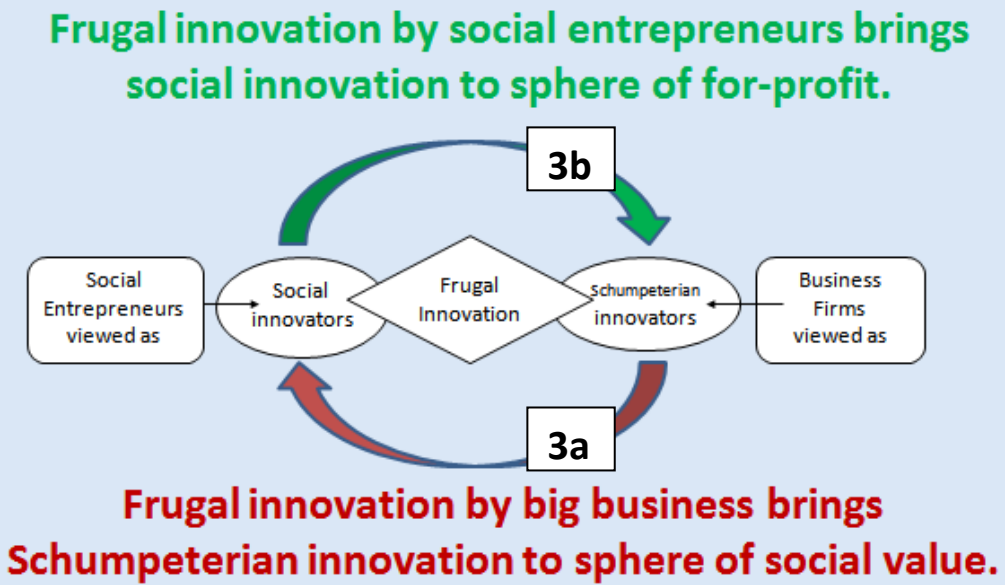


Figure 4.5: Interpretative theoretical perspectives on conceptions of (frugal) innovation

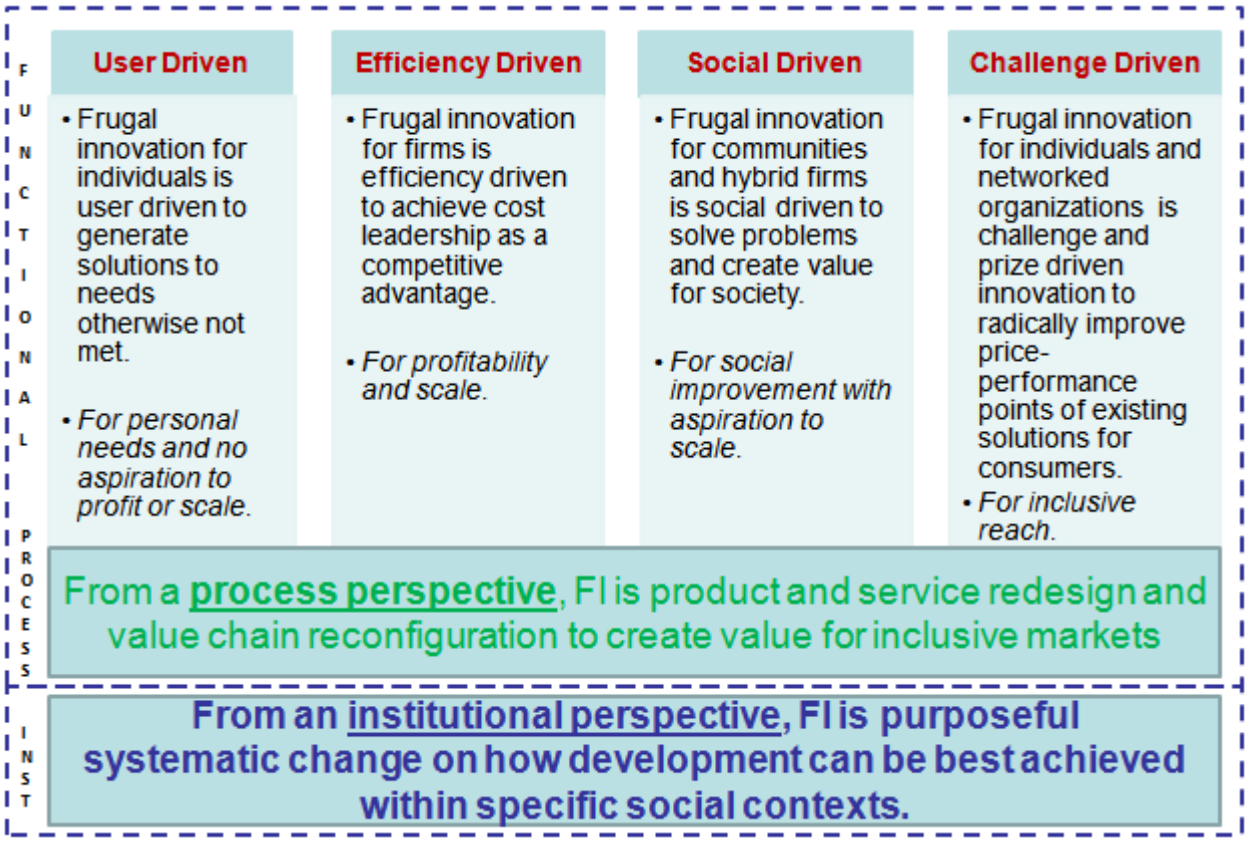


Table 4.1: Stages of analysis for question 1

Stages	Tasks	Outcomes
1. Collate data and develop descriptions	1. Collate texts, scan handwritten notes, transcribe interviews. 2. Identify responses to questions posed	Table 4.2a: Sample responses to application form questions Table 4.2b: Sample responses to questions posed Figure 4.1: Screen shots of hand written notes with first pass on analysis
2. Categorize Information	3. Identify constructs as first order codes	Twenty five constructs: *By grass root individuals; By large firms; By entrepreneurial actors; By designers; For underserved; For solving needs; For cost leadership & competitive advantage; For social improvement; For challenge; Non profit motive; For high profits; For Profit/Non profit; Reasonable profits; Making do; Good enough solutions; Surpass expectations; Radically improve some performance metrics; No attainable solution; Stay ahead of competition; Rectifying inequity; Design breakthroughs; Little scaling; High scalability; Ambition to scale; Proof of concept*
3. Identify patterns and connections among first order codes	4. Integrate first order constructs into second order codes, themes, or dimensions	Figure 4.2: Coding Sequence Eight second order dimensions identified: *By whom, for whom, for what, economic orientation, nature of solution, necessity based, ideational based, and scalability.* Table 4.2c: Breakdown in number of passages that support findings from data triangulation Table 4.4: Summary intermediate table showing all constructs and themes
4. Aggregate theoretical dimensions on perceptions of innovation	5. Label dimensions based on emergent concepts or on existing ones found in the literature 6. Identify descriptions exemplifying themes for display	Four themes identified: *User based, Efficiency based, Challenge based, and Social based* Table 4.5: Archival document data supporting different conceptions of innovation (user, efficiency, social, challenge) Tables 4.6a,b,c,d: Interview data supporting different conceptions of innovation Two axis for aggregating four themes into model: *Necessity based versus Ideational based &* *Proof of Concept versus Scalability* Figure 4.3: Matrix model on perceptions of innovation Figure 4.4: Interpretative theoretical perspectives on perceptions of innovation

Table 4.2a: Snapshot of responses to application form questions

		2011	Organization	Mission	1. How is your approach innovative (better then alternatives)?	2. Describe the key innovation(s) of your organization (e.g., business models, products or services, processes, value	3. Explain the potential for these innovations to be deployed or replicated elsewhere.	4. Explain the potential for licensing these innovations.	5. Major challenges facing organization	6. Biggest obstacles to future growth
2011S25	25	2011	Nirantara Livelihood Resources	Facilitating Integrated Sustainable Agriculture Management Solutions to Small & Marginal Farmers	Some of the services envisaged by Nirantara Livelihoods are being provided by some commercial companies & government, in some parts of India, but in isolation. Our social enterprise will follow an integrated approach to minimize risks associated to farming, especially with small & marginal farmers. This approach makes great sense at the time of farming distress in India and this would provide continuous and stable income flow to small & marginal farmers.	1. Institutional Development, Building Farmers' Institutions and Ownership: o Nirantara Livelihoods organizes small & marginal farmers in to homogenous groups, centers and Village Farm Committees to build their capacity and help in aggregation of resources o Small and marginal farmers have an option to invest in their collective i.e. Producer Company by becoming a shareholder. In turn several such Producer Companies invest & hold majority stake in Nirantara Livelihoods By doing so, farmers become owners of Nirantara Livelihoods and they will share in the	Our pilot program with 2,000 farmers will provide opportunity to test out this business model. However, we are quite confident of our expertise and knowledge on local dynamics.		The approach of iSAMS is relatively new. This concept is not tried and tested out intensively in an integrated manner. Hence to make this idea successful, we need to be innovative in every step. We need to be a learning organization in every phase of our growth.	External factors, such as following, will be biggest obstacles: 1. Policy environment 2. Bad weather condition 3. Significant variation in cost of inputs and market price of produce

Table 4.2b: Sample responses from among 242 passages emanating from main interview questions posed

1. In what way have you come across innovation? What is your perception about it? • *Innovation is about innovating products mainly for social causes. One such project I am working on is an ATM dispenser for medicines that ensures the authenticity of medicines and 24x7 availability. (2M)* • *I told GE that 10-15% cost reduction as being talked about means they are not serious in addressing the BOP. Instead they need a 10 fold decrease. (2M)* • *Innovation is about overcoming constraints such as resources to make do with what one currently controls. (4E)* • *Innovation is about design for social problems, needs and contexts such as supply chain and lack of infrastructure concerns. It is all about common sense and de-sophistication. Recall the NASA ball point pen for $5m versus a $1 pencil. (8F)* • *I don't agree with handout models like Solvatten selling expensive solutions to NGOs and donors because it isn't sustainable. At Nazava we believe in the market and selling directly to the consumer. (22E)* • *Frugal innovation is about low cost due to fewer resources but more importantly it is about social needs. (24M)*
2. Can you provide examples? • *I came up with the N100 light as a technology concept myself and then went out looking for a market. Based on feedback and learning, it changed to a better N200 model, but that doesn't mean that an invention without an application or market doesn't succeed. Take the examples of 3M post it notes and photovoltaic bulbs which both came out of serendipity. Bulbs are now used all over the world because price points came down to be affordable. (25E)* • *The development of GSMA standards helped to lower cost of technology for all to be able to afford. And mobile is probably the only sector through which MNCs have innovated widely for the BOP. (2M)* • *GE's Healthy Imagination Initiative has not succeeded in reaching rural areas -- it has reached middle income towns but not the BOP. (2M)* • *At Husk Power we use abundant and inexpensive local husk as raw material and we train local labour and redesign power meters to achieve low cost frugal innovation. (4E)* • *Solar sisters is another low cost and simple delivery model of frugal innovation to get products to users. (10I)* • *One side of frugal innovation comes from GE's pitch on a public relations campaign for CSR or other issues on emerging markets. (21F)* • *The cause is more important than the cost because if the cause is right, then the money will follow. For instance, over the last ten years we have helped to provide 200K homes in Philippines with no money whatsoever. Our cause attracted government and corporate donations combined with 1000 hour time investment from the beneficiaries for building their own houses. (24M)*
3. How could it be useful to you or others? • *Market rate return expectations among VCs was 18-22% during pre 2000s. Now it is closer to a much lower and realistic 2-5%. So this should now raise opportunities for even the optimistic 10% IRR possible with low margins but high volume in BOP markets. (10I)* • *Jugaad is not acceptable in India among corporations and even among villagers. If you say this is a jugaad water filtration device, the villagers will not use it. (21F)* • *The frugal innovation component is only in its second year now. Although too early to*

say but evidence of value add to the programme has been sketchy. (15F)

- *Partnerships are however very useful with NGOs in creating awareness and to develop distribution network in remote areas where NGOs often have access to. (22E)*
- *For BOP consumers good quality and aesthetics are very important because for them the relative investment is very high -- akin to buying a Ferrari for us! So they are looking for the most high quality filters like the Britas. Customers are aspirational and look to high status products over cheap ones. (22E)*
- *There is some level of jugaad used in SME's but in a little more structurred manner. They still don't have formal RnD processes. (36M)*
- *The danger in frugal project is that faculty externally do not get evaluated for tenure on frugal service but rather on basic research in high quality journals. (39F)*

4. What lessons have you learned?

- *Frugal innovation may serve as a measure of success for a firm functioning in developing or emerging markets. (37F)*
- *Our problem focus is uniquely positioned for our model to work because cataract is a disease which lends to cross subsidization. It affects all regardless of rich or poor or ethnicity. (33M)*
- *However there have been concerns among external project judges that such frugal projects do a disservice to students because we do not expose them to the latest, high end technologies which they may need for jobs in silicon valley. I don't agree with that contention because technologies change quickly and become obsolete, we instead want to teach our students useful mindsets and processes. (40F)*
- *I've learned that time is money in Africa too, not just in the West! (46E)*
- *The Gates foundation has been blogging that if you in the BOP segment, you should be mobile. So many funders are telling us what they are interested in. (47I)*
- *As a product designer I am motivated by the outcome, but driven more by the challenge to innovate for these demanding customer needs in these demanding environments. (51E)*

Table 4.2c: Breakdown in number of passages that support findings from data triangulation

	Archival Documents (163)	Interviews / Field-notes (70)	Total	%
Social-based	100	75	175	33%
User-based	58	54	112	21%
Challenge-based	74	59	133	25%
Efficiency-based	49	54	103	20%
Total	**281**	**242**	**523**	**100%**

Table 4.3: First order codes for sub question 1

Question	*Texts and interviews were coded into*	
How do social entrepreneurs view innovation?	1. By grass root individuals 2. By large firms 3. By entrepreneurial actors 4. By designers 5. For underserved 6. For solving needs 7. For cost leadership & competitive advantage 8. For social improvement 9. For challenge 10. Non profit motive 11. For high profits 12. For Profit/Non profit 13. Reasonable profits	14. Making do 15. Good enough solutions 16. Surpass expectations 17. Radically improve some performance metrics 18. No attainable solution 19. Stay ahead of competition 20. Rectifying inequity 21. Design breakthroughs 22. Little scaling 23. High scalability 24. Ambition to scale 25. Proof of concept

Table 4.4: Summary intermediate table showing all constructs and themes

	USER BASED	**EFFICIENCY BASED**	**SOCIAL BASED**	**CHALLENGE BASED**
By whom	By grassroot individuals	By large firms	By entrepreneurial actors	By designers
For whom	For underserved	For underserved	For underserved	For underserved
For what	For solving needs	For cost leadership & competitive advantage	For social improvement	For challenge
Economic orientation	No profit motive	For high profits	For profit / non profit	Reasonable profits
Nature of solution	Making do	Good enough	Surpass expectations	Radically improve some performance dimension or lower cost
Necessity based	No attainable solution	Stay ahead of competition	No data	No data
Ideational based	No data	No data	Rectifying inequity	Design breakthroughs
Scalability	Little scaling	High scalability	Ambition to scale	Proof of concept

Table 4.5: Archival document data supporting different conceptions of innovation (user, efficiency, social, challenge) – 281 passages

	User Driven						Efficiency Driven					
For underserved	**By grass root individuals**	**For solving needs**	**For Non profit**	**Making do**	**No attainable solution**	**Little scaling**	**By large firms**	**For cost leadership & competitive advantage**	**For high profits**	**Good enough solutions**	**Stay ahead competition**	**High scalability**
Over 15 years CEMINA has been investing to provide educational content and skills to underserved communities through the use of radio. 2011s59	(Mission is) Providing microfinance, training and virtual marketplace to grassroots youth entrepreneurs and women. 2007s104	Create sustainable solutions to help the needy.2011S9	Operates with a unique non-profit structure as an organization run entirely by youth for youth. 2007s87	I am always on the look out for new communications technology and communications systems, anything that is available off the shelf and cheap. While I would not risk being on the bleeding edge of technology, it is always a good bet to be ahead in general. 2007s105	Devise self-sustainable solutions to problems that have eluded solutions in the past. 2007s57	Like a lot of "grassroots" organizations, we grew out of passion, not out of a rational plan to create an organization that will last. But, obviously, passion can only carry you so far. So, we must now focus on sustainability and organizational stability. 2007s81	As a result of Phulki's innovation, many other large public and private sector organizations are adopting the work place based childcare facilities including one at the Secretariat of the Government Republic of Bangladesh. 2005s161	(We) customized an in-house management process to ensure competitive advantage. 2011s41	Thus the Insulpanel System is an integrated whole, which offers for the first time a new building technology and the basis for a new and very profitable business operation. 2006S106	A key innovation of Build Change is the PROCESS for post-disaster housing reconstruction programs that produce safe, satisfactory, and sustainable houses. 2007S58	(We pose) Effective competition with substitute products and new technologies 2007S92	Mainstreaming our successful activities nationally and on EU level. 2011s13

Social Driven						Challenge Driven					
By entrepreneurial actors	**For social improvement**	**For Profit/Non profit**	**Surpass expectations**	**Rectifying inequity**	**Ambition to scale**	**By designers**	**For challenge**	**Reasonable profits**	**Radically improve some performance metrics**	**Design breakthroughs**	**Proof of concept**
Creating Entrepreneurs: Participants will be the nucleus of micro-entrepreneurs for growing Moringa trees. 2011s12	Provide Free Internet services to all the citizens inside the coverage area (by) choosing the right places to deploy our project, so that we can have the biggest social impact. 2011s20	For profit – Wireless Wide Area Networks for branch connectivity for Banks and other organizations. Not-for-profit – Javelin: Internet access for secondary schools in poor countries via mirrored sites. 2007s55	Deploying multidisciplinary expertise in exceeding customers' yearnings and marketplace expectations. 2011S39	Bridging the digital divide in the most marginalized and fragmented sector – agriculture. 2006s109	Nevertheless, we do wish to reach out to more people and do much more than our current programmes and improve our systems. 2007s69	As engineers and engineering managers we have experience in many aspects of the business process but glaringly little when it comes to the MECHANICS or running a business. 2007s82	In addressing the challenges facing the most disadvantaged families, we have pioneered the provision of services both comprehensive in scope and 'cradle-to-grave' in nature. 2011s13	At present, reading glasses are sold exclusively by eye doctors and optical shops at significant margins making them too expensive for the average person. 2006s132	(Our) Initiative introduces a new concept in water manufacturing based on Artisan in Mineral Water. This is a HUGE step to make difference with the water industry proposing product conformity and standardization. 2011s21	We believe our approach of global R&D in a combination of wealthy countries and developing countries is the key to continuing to provide new breakthrough clean technologies to the customers that frequent the small shop in emerging markets. 2011s11	Prototypes will be used as a marketing tool to create better awareness in the minds of the producers (local people) and consumers (local people and eco-sensitive consumers abroad). 2011S5

Table 4.6a: Interview data supporting different conceptions of innovation for USER BASED – 54 passages

By whom	By grassroot individuals: • Jugaad is limited to grassroots with little entrepreneurship and ambition for scaling. (36M); • There is some level of jugaad used in SME's but in a little more stuctured manner. They still don't have formal RnD processes. (36M); • I come from a farming and rural background. When I attended a class on Climate Change for Social Justice the instructor mentioned frugal innovation and I was drawn to it and sought out this class. (38F); • However large firms do not use much of jugaad as it denotes unsophistication and unstructured process of innovation. They do more of the formal RnD led innovation. (36M)
For whom	For underserved: • In India innovation is at the grassroots level as in the case of Jugaad, a term that denotes making do with whatever resources are on hand. One common practice is to reuse a water pump engine for another unmeant purpose like a rural van. Or like the clay fridge. So people are creative, however in an unstructured way. (36M)
For what	For solving needs: • I took them (students) to Housesafe near Santa Clara, a community programme for battered women and tried have my students solve some of their needs. And the women surprisingly contributed to creating the solutions. So inequities lie everywhere and relatively speaking the differentials are worse in Silicon Valley where the rich-poor divide is huge. (40F)
Economic orientation	No profit motive: • Most funds did not care if the segment is rural or urban. But this is changing now given the rural BOP are 3X less wealthy in PPP than urban. There are now reports which warn not to expect to become rich from serving the BOP. (10I)
Nature of solution	Making do: • Frugal innovation is about overcoming constraints such as resources to make do with what one currently controls. (4E) • Three years later this device helped the family increase income generation and the family did all the kinds of financial and technological improvisations to assure the device was sustained and maintained. They initiated advance service agreements and used spare parts not orginally designed for it. (23E) • The flying villagers as in Peru are an example of Jugaad. That kind of practice would never be allowed here in USA. (20F)
Necessity based	No attainable solution: • It isn't that easy to do perhaps because the solutions are not suited or amicable to where the problems are. (34F)
Ideational	**No data**
Scalability	Little scaling: • Jugaad is limited to grassroots with little entrepreneurship and ambition for scaling. (36M) • Jugaad is not acceptable in India among corporations and even among villagers. If you say this is a jugaad water filtration device, the villagers will not use it. (21F) • Jugaad or FI cannot work in the USA because those kind of cars and tractors would not be allowed to run on the roads here. Plus used cars are so affordable here that the need for a Tata Nano seems to not exist. (20F)

Table 4.6b: Interview data supporting different conceptions of innovation continued for EFFICIENCY BASED – 54 passages

By whom	By large firms: • As CEO of the company I ran, I would now go back and have a project team working on for instance cookstove combustion, not just to fulfill the need, or opportunity for profit, but to learn from new contexts and constraints. (41M); • Japanese techniques borrowed from J.Demming belief that quality is free, because if it weren't then you'd pay for it in much more in after sales service and loss. In the 70s and 80s the Japanese showed that low cost and high quality were not mutually exclusive. (12F); • Frugal innovation may serve as a measure of success for a firm functioning in developing or emerging markets. (37F)
For whom	For underserved: • If there is one thing I would, that is to make executives of large organizations aware of the opportunity in large BOP population markets. (41M) • GE's Healthy Imagination Initiative has not succeeded in reaching rural areas -- it has reached middle income towns but not the BOP. (2M)
For what	For cost leadership & competitive advantage: • To me it (frugal innovation) is about solving a problem in the most efficient manner possible. (46E) • Competitive advantage emanates from increasing sustainability, lower costs, most useful functions, market access, best value quality, and easiest to buy through financing options. Lower cost or price is easiest to achieve but does not allow for sustainable competitive advantage. The deeper you go in your business model to achieve other strategies, the more sustainable your competitive advantage becomes. (12F)
Economic orientation	For high profits: • Cost reduction has been about greater profit margins for the company. (29F) • I do not limit my endeavors to social products or ventures but rather a wide range of sectors like healthcare, energy, and cosmetics as long as they are deemed profitable. That is crucial to help sustain the business model in that particular context. (32M)
Nature of solution	Good enough: • What we (at Intel) learned from impending competition from OLPC was to redesign the processor for low cost netbooks with good enough performance. So yes the West can learn from technology application in developing countries. (4E) • It is all about common sense and de-sophistication. Recall the NASA ball point pen for $5m versus a $1 pencil. (8F)
Necessity based	Stay ahead of competition: • I used to work for Intel in USA and here (USA) it is about exceeding requirements with focus on sophistication. At Intel we outpace many of the technological features for use by consumers. However the Intel Atom processor was a change of mindset brought about by competition from OLPC. We redesigned the processor for low cost and good enough performance for netbooks. (4E)
Ideational based	**No data**
Scalability	High scalability: • I think social entrepreneurs are the same as entrepreneurs. Social entrepreneurs are good at experimenting and exhibiting proofs of concepts. However large organizations are good at scaling. But this is no different from regular silicon valley entrepreneurial models where small firms are sold to large ones. What is different though is the IRR from these ventures. (41M) • Soon you will see companies like eHealth and Husk Power will be acquired by MNCs. This would help achieve scalability goals as MNCs are good at replicating what works well. (2M)

Table 4.6c: Interview data supporting different conceptions of innovation continued on SOCIAL BASED – 75 passages

By whom	By entrepreneurial actors: • Frugal Innovation is about innovating products mainly for social causes. One such project I am working on is an ATM dispenser for medicines that ensures the authenticity of medicines and 24x7 availability. (2M); • I got involved in 'frugal' in the early 1990s when I was the first female professor at the engineering school here with very few female students. (40F); • Frugal innovation seems to solve problems of the poor by designing solutions for them. This means understanding their needs in those particular contexts. I am personally drawn to it (FI) for my interest in sustainability. (52F)
For whom	For underserved: • Frugal innovation is a nice effort to partner technology with entrepreneurship to come up with novel solutions for social problems that are chronic & acute. (34F) • A lot of students now realize they need to design solutions for the rest of the world not just for the USA because i) the markets are there for both MNCs and entrepreneurs ii) the Jesuit mission to help the underserved poor. (39F)
For what	For social improvement: • I got involved in 'frugal' in the early 1990s when I was the first female professor at the engineering school here with very few female students. (40F) • My feeling is that frugal innovation is an outcome that occurs after you've engaged with the society you wish to serve in developing countries. (37F)
Economic orientation	For profit / non profit: • A major difference b/w Salauno and Aravind is that we are for profit. But we believe we can make enough surplus to do free eyecare for low end and yet still make profits for our founders and investors. (44E) • I use a hybrid model of investing because the rate of return in social enterprises is very low and takes a long time. So I make up for the delay in financial return through regular investing. (50I)
Nature of solution	Surpass expectations: • In reality frugal innovation may actually be very expensive to do for entrepreneurs. It is something they have to do when they face frugal consumers. Say for instance Lifeline technologies, has turned out to be very robust and expensive. And the same thing with D. Light. (37F) • Frugal innovation is about jumping or leapfrogging alternative solutions to use high tech and high quality but at affordable levels. (43F) • At Aravind we are talking about design not for the 1% or 99%, but for the 100%. (33M) • So the self imposed constraints have to be at a higher level than the norm, otherwise your solutions will be the same as everyone else's. (33M)
Necessity	No data
Ideational based	Rectifying inequity: • Frugal innovation is one done under constraints. In Aravind's case it isn't just contextual constraints but also self imposed constraints that are drawn from values of the founders and the firm. Aurolab was initiated because we wanted the poor to have the same high end lenses, so it was a major contribution but not alone. (33M) • The services for the poor are not marginalized in a separate unit, rather integrated to the extent that if the poor are not served, then the Aravind system breaks down for all. (33M) • Several of our Senior Design projects involve a social justice component which we implement through engineering solutions. (T1)
Scalability	Ambition to scale: • In a mature developed market you can use retailers like Walmart and Amazon to sell multiple products to many customers. However in developing economies you instead need to partner with intermediaries to focus on a use case, gain large 'shadow effect' then replicate to scale in these markets. (26M) • Cost per outcomes are an attempt by social ventures to be more financially relevant to investors. Reducing the cost per outcome also exhibit scaling up potential since one can do more with little. (1F) • On learning from us, we do 300K surgeries a year and have enabled others to do another 1 million a year. (33M)

Table 4.6d: Interview data supporting different conceptions of innovation continued on CHALLENGE BASED – 59 passages

By whom	By designers: • As a product designer I am motivated by the outcome, but driven more by the challenge to innovate for these demanding customer needs in these demanding environments. (51E); • I understand frugal innovation from Radha's perspective on low cost, rugged, user friendly, and simple. As an engineer I recognize these are very challenging design criteria. (27I); • And it is particularly hard for designers in West to accomplish this for developing world because of cost reduction impediments and inability to understand fully needs of those communities. (19M); • It isn't that easy to do perhaps because the solutions are not suited or amicable to where the problems are. (34F); At Aravind we are talking about design not for the 1% or 99%, but for the 100%. (33M)
For whom	For underserved: • I perceive frugal innovation as appropriate technologies for the BOP in global markets. Pre built solution ingrained in engineers' minds are not successful. (40F)
For what	For challenge: • As an engineer bringing 10% cost reduction is difficult with next 10% even more so and the next 10% even worse. (19M) • And for the 'techie' students the frugal contexts present interesting challenges of different performance dimensions as well as an understanding of the whole ecosystem embodying engineering for humanity as opposed to just the role of technology. (40F) • So the self imposed constraints have to be at a higher level than the norm, otherwise your solutions will be the same as everyone elses. (33M)
Economic orientation	Reasonable profits: • A challenge is how we move away from maximum margins to reasonable margins for all in the value chain. (30E)
Nature of solution	Radically improve some performance dimension or lower cost: • I told GE that 10-15% cost reduction as being talked about means they are not serious in addressing the BOP. Instead they need a 10 fold decrease. (2M) • BOP customers are actually pretty demanding and rather sophisticated in recognizing what is more high quality and aesthetically expensive looking in their choices. And this is part of the challenge for designers in the North innovating for the BOP in South. (23E)
Necessity based	No data
Ideational based	Design breakthroughs: • Most people try to do disruptive innovation through standard constraints as opposed to self-imposed constraints. But recall Einstein that the same level of thinking cannot solve problems that created them in the first place. (33M) • Here they rely on Moore's law to increase performance and lower prices. However in areas where I function, you need to do more than just that. (51E)
Scalability	Proof of concept: • As an investor I would look for a focused reference-ability model that achieves scale in developing economies. (27I) • I use design thinking to setup new microfranchise businesses such as ideation and prototyping, microlight marketing, and quick and dirty proofs of concepts. (32M)

5 HOW DO SOCIAL ENTREPRENEURS CONCEPTUALIZE INNOVATION UNDER INSTITUTIONAL VOIDS & RESOURCE SCARCITY?

5.1 Introduction

Recall the main thesis question is: How do social entrepreneurs perceive innovation broadly and under extreme conditions marked by institutional voids and resource scarcity? This was broken down into three distinct sub research questions of which the second and third were:

2. *How do they conceptualize innovation under institutional voids?*
3. *How do they conceptualize innovation under resource scarcity?*

The objective of this chapter is to reveal findings from an exploratory and descriptive analysis on the second and third sub research questions. The literature review in chapter 2 comprising innovation by social entrepreneurs, institutional voids, and resource scarce environments shows there is no study on innovation under both institutional voids and resource scarcity. I find from the analysis in this chapter what the conceptual drivers and determinants of innovation look like under both institutional voids and resource scarcity. These are reflected in the 32 first order and 9 second order codes which were then summarized into three theoretical dimensions found in existing literature and portrayed in a "model of innovation under constraints".

As described in section 2.8, I use a value chain conceptual framework to analyze the data to determine how social entrepreneurs perceive innovation under constraints. The use of value chain for analyzing innovation activities is supported in established innovation studies (c.f. Kaplinsky and Morris 2001; Hansen and Birkinshaw 2007; Roper, Du and Love 2008;

Dedrick, Kraemer, and Linden 2010). These constraints are reflected in the value chain conceptual framework as institutional voids and resource scarcity. Any study of innovation by social entrepreneurs should consider how resource constraints are faced both upstream and downstream for all users at any point of the value chain in conjunction with having to function within institutional voids and resource scarcity. In the "extreme resource constrained" contexts (Mair and Marti 2009) resources may be scarce at all points of the value chain meaning that affordability is not just a concern for the end market consumer but for any firm wishing to employ another firm's outcome as inputs to its own processes. So affordability is not just a concern at the end point or outcome of innovation. Therefore I analyzed sub question 2 and 3 by using a value chain innovation perspective to develop the conceptual framework on innovation activity under both institutional voids and resource scarcity.

From this value chain analytical perspective we can hypothesize what innovation could mean to both the upstream supplier and the downstream consumer. From the social entrepreneur or supplier perspective, a solution has to be designed, produced, delivered, and maintained to achieve the needs of underserved consumers in constrained environments. The entrepreneur may have to function in an environment marked by one or all of constrained resources and institutions. From the consumer perspective, a solution may be low cost and affordable. But affordability could extend beyond simply the cost of the solution to include operational and disposal costs. A product or service does not stand alone but may need complementary solutions, resources and infrastructure to perform to its full potential. This could mean not just lowering the cost of the product, but also question how it is designed to operate in the resource constrained context in which it functions to use fewer resources and against complex or lackluster institutions.

5.2 Analysis and coding

As described in detail in chapter 4, I analyzed qualitative data comprising texts, interviews and field notes to reveal the findings I outline in this chapter. The four main stages for analysis are summarized in table 5.1. Again these stages were not purely sequential, but rather I moved back and forth in an iterative and systematic process. This iterative process stemmed from the reasons described in chapter 4 of using Ragin's (1994) and Ragin and Amorosso's (2010) retroductive approach and thematic content analysis using King's (2004) template analysis technique. I describe this process in this section to show how I went from the data to the findings I divulge in this chapter.

<See table 5.1, page 212>

In the first stage I went through all the collated data comprising application forms, transcribed interviews, and digitized and scanned hand written field notes to identify passages that seemed to relate to either or both of the two investigative and analytical themes -- institutional voids and resource scarcity. Table 5.3a and 5.3b show sample passages that address institutional voids from archival documents (296 passages in total) and from interviews and field-notes (123 passages), respectively. The purpose of separating the two data sources was to provide transparency in the effort for triangulation. Similarly, table 5.4a and 5.4b show sample passages that addressed resource scarcity drawn from archival documents (398 passages) and from interviews and field-notes (131 passages), respectively. Finally, table 5.5a and 5.5b show sample passages that address both institutional voids and resource scarcity drawn from archival documents (50 passages) and from interviews and field-notes (41 passages).

<See tables 5.3a and b, pages 214 and 215>
<See tables 5.4a and b, pages 216 and 217>

<See tables 5.5a and b, pages 218 and 219>

Table 5.6a provides a summary of the breakdown in the number of passages drawn from the different data sources for purposes of coding and triangulation. In total, 1,039 passages were coded, and almost twice as many were drawn from the archival documents that numbered 163 as compared to those from interviews and field-notes of respondents numbering 70.

<See table 5.6a, page 220>

Table 5.6b shows a comparison across types of interview respondents that addressed the two analytical constraints. We see almost twice as many entrepreneurs discussed resource scarcity issues than institutional voids while among the other respondents, mentors, investors, and programme administrators and lecturers, institutional void concerns were discussed more substantially than resource scarcity concerns. In particular, almost twice as many investors talked about institutional voids than resource scarcity which was the opposite trend seen among entrepreneurs. This suggests that entrepreneurs were focused more on challenges of resources while investors were more focused on institutional challenges.

<See table 5.6b, page 220>

In the second stage, I categorized the data by identifying first order constructs or codes. I first identified main constructs for institutional voids and then for resource scarcity. As in chapter 4, the idea here was to use *in vivo* codes that reflected as closely as possible the actual narratives. New first order codes were added to the template with each iterative round of analysis. Some codes were changed, merged or split as the data sources provided information which couldn't be accommodated within the existing template. In the last round of iteration which settled on the current template, new first order constructs identified through

triangulation were self-sufficiency and capacity building within second order theme of "develop capabilities", awareness and advocacy within "boundary issues", empowerment within "access provision", and intellectual property within "build structures". Table 5.2 shows the (thus far) settled 32 first order codes, 11 of which addressed institutional voids, and 21 resource scarcity.

<See table 5.2, page 213>

In the third stage, I sought to identify and understand patterns and connections among the first order codes to integrate them into second order themes. I did so by repeatedly reviewing the first order codes until I could find common aspects that explained the variation across second order clusters or themes. Table 5.7 shows the outcome of clustering first order codes into second order themes.

<See table 5.7, page 221>

Finally in stage four of the analysis, I sought to aggregate theoretical dimensions on institutional voids and then on resource scarcity. The theoretical dimensions emanated from grouping second order codes into higher level abstractions. The purpose here was to label dimensions based on emergent concepts or on existing ones found in the literature. I found three existing ones in the literature: *technology, social, and institutional innovation*.

Exemplary quotes from data that support the three aggregate theoretical findings further broken down by second order and first order codes are outlined in tables 5.8a, 5.8b, 5.9a, 5.9b, 5.10a and 5.10b. Again, tables for each dimension were split based on data source so as to provide transparency in the effort for triangulation. Tables 5.8a and 5.8b outline archival document data supporting theoretical dimension of institutional innovation (293 passages) and interview data supporting theoretical dimension of institutional innovation (188

passages), respectively. Tables 5.9a and 5.9b outline archival document data supporting theoretical dimension of technology innovation (182 passages) and interview data supporting theoretical dimension of technology innovation (109 passages), respectively. Tables 5.10a and 5.10b outline archival document data supporting theoretical dimension of social innovation (289 passages) and interview data supporting theoretical dimension of social innovation (144 passages), respectively.

Table 5.6c provides a summary of the breakdown in the number of passages from the different data sources that were coded in support of each of the three aggregate theoretical dimensions. In total, 1,205 instances of the passages were coded, again almost twice as many from archival documents than from interviews and field-notes. While institutional and social innovations enjoyed almost equal support from the data, technology innovation enjoyed about a third less in support from the data. This suggests that social entrepreneurs were more likely to be concerned about institutional and social innovation than technology innovation. Another thing that comes out from this table is that since the baseline number of passages was 1039, 166 passages were double coded over social, institutional and technology dimensions. The overlap suggests intersecting spaces between the dimensions where two or three innovation dimensions occur alongside.

<See table 5.6c, page 220>
<See tables 5.8a and b, pages 222 and 224>
<See tables 5.9a and b, pages 226 and 228>
<See tables 5.10a and b, pages 230 and 232>

5.3 Data supporting first order codes and second order themes

In this section I describe each of the first order codes through representative data. I structure this section according to first institutional voids and then resource scarcity, the latter of which is in turn split into resource constraints and affordability constraints. Within the three analytical concerns, I layout the descriptions for first order codes around the nine second order themes. Three second order themes were identified for institutional voids: Build structures, boundary issues, access provision; three for resource constraints: Scope of solution, tone down, improve performance or efficiency; and three for affordability constraints: Resolve needs and meet aspirations, reaching out, and develop capabilities. Eventually the second order dimensions served to identify third level theoretical abstractions which will be outlined in the subsequent section after I outline in detail the data which supports the coding template shown in figure 5.1.

<See figure 5.1, page 211>

5.3.1 Institutional voids (soft)

The second order themes that addressed institutional voids were *building structures, dealing with boundary issues, and providing access provision*. As per the conceptual framework based on value chain, the former two addressed mainly 'soft' institutional voids and the latter addressed 'hard' institutional voids. I say mainly, because I find that the construct of partnerships relates to both the soft and hard features of institutional voids and thereby links one type of constraint to another and is depicted in arrow A in table 5.7.

I. Boundary issues

In the second order theme of 'boundary issues', the social entrepreneur community revealed issues that related to various boundary concerns, such as dealing with context, culture, globalization and localization, and awareness and advocacy.

1. Context : Respondents were aware of their environment and discussed issues that lay at the boundary of themselves and their organizations' and the context in which they functioned. An entrepreneur described how initially the context was ignored but they had to innovate their product in response to how the original plan did not fit in with the context and environment:

"Initially we imported pads but found that the pads were clogging toilets and were not biodegrading creating greater health risks. So we came up with a patent pending chemical less process to manufacture biodegradable pads. And the localization manufacture policy in South Africa and India helps to establish local manufacturing capability." (11E)

A faculty member believed that the approach to sophistication that is applicable in Silicon Valley is not necessarily applicable to other contexts:

"In silicon valley more sophistication is done because we can do it. However, best or most innovative technology is not the best solution in all contexts." (21F)

Along the same lines, another programme member explained further that innovation by social entrepreneurs is particularly difficult because often the solutions currently available or targeted to certain contexts weren't originally suited for those purposes or contexts:

"It isn't that easy to do perhaps because the solutions are not suited or amicable to where the problems are." (34F)

This construct of the importance of context was validated using triangulation through the data source of archival application forms. All these forms were completed by shortlisted entrepreneurs. The following quote supports the idiosyncrasies involved in innovating for different contexts:

"Currently, there are no national products for greenhouse automation produced in Mexico. The products available are imports which do not take into account the needs of the Mexican market in terms of climate, culture and the goals of individual farmers." (2011s32)

The following narration from the archival forms described the complexities involved in adapting innovations to the local language, translating the information to English, and then back to the local language:

"Padma have faced challenges at different level of the intervention. First of all, when communicating with local farmers, then its found that they use some local terms (not pure Bengali) for their farming and the farmers of different villages use different local terms. It was very hard then to capture those local terms and convert into English to communicate with international researchers and again re-deliver the feedback to the farmers in their local terms." (2011s15)

2. Culture: Following up from the above first order code of context, culture came out as a concern among the social entrepreneur community. Culture is one major aspect of context that factored in on how they responded differently to their environments:

"It becomes quite expensive to innovate for the BOP because of rural access, cultural interpretation, and language. E.g. tribal leaders have to give authorization for access to village people. In contrast, in the developed countries one can quickly contract out a market survey or focus group research to get quick product feedback." (20F)

The archival forms support the construct of culture to be taken into account in innovation through the following two narrations, one of human rights in China and the other of school children in Pakistan:

"In the next stage of the project, HRIC will be working with technology partners to develop additional technology solutions adapted for the specific technical and cultural challenges of China. These software tools will include linguistically and culturally accessible Internet censorship circumvention technologies and a tailored human rights violation database." (2006s121)

"Cultural restrictions in many urban slums and rural villages in Pakistan, many families a reluctant to send their daughter to school. In order to promote girl enrollment, TCF inducts only female faculty in its schools. Thanks in part to this policy, TCF schools report an almost 50% female student enrollment. In order to hire and retain female faculty, we provide them transport in especially designated TCF vans. These provide a safe and dependable transport system for our faculty which in turn promotes regularity and commitment to work." (2007s98)

3. G(l)ocalization : There were two related, but contrasting issues here: globalization and localization. An entrepreneur revealed he learned about different approaches and methods to manufacture his product locally as he travelled around Africa:

   "I learned much from travelling as a grant assessor with the World Bank and saw different tools and techniques all over Africa." (14E)

   Another member described that emerging markets are an advantage because of globalization of technologies, an advantage which was not enjoyed by the current developed markets of the world:

   "Emerging markets have several platform technologies available to them from global sources. This privilege was not available to the US a hundred years ago." (43F)

   In the following example, the social entrepreneurs pursued a globalization strategy by importing from Brazil but then shifted to a mix of globalization and localization by importing some and assembling other parts locally:

   "Initially we imported complete systems at high cost from Brazil to Indonesia. But then we found a supplier in India from whom we import parts at low price and assemble locally in Indonesia using other local parts like taps." (22E)

   In support of the above use of both global and local approaches, the following three quotes support this mixed use in achieving the intended goal of change and innovation:

"In this way, we have created the tools for students to act locally for global change." (2007s47)

&

"We believe that the integration of media, radio [local and low tech] with the Internet [high tech and global] helps to overcome many of the barriers to benefit from the opportunities that globalization has brought." (2007s59)

&

"This project facilitates communication from global to the local and back to the global level via intermediary knowledge brokers." (2011s15)

4. Awareness / Advocacy : This construct involved making people aware of the issues, challenges, or opportunities on hand and / or then having those same people further advocate for change. Awareness and advocacy was deemed in many cases as a necessary precursor to the adoption of technologies, products or services. The two next quotes from entrepreneurs described awareness as necessary for the adoption of intended products in the first quote and services in the second quote:

   "We are focused on advocacy and training to raise awareness of taboo issues (women sanitary pads). Once the awareness is created, individuals naturally seek out sanitary pads. We cannot even donate pads in an environment where they aren't culturally or socially accepted." (11E)

   "Kenya currently does have local alternatives to insurance, but these are often mobilized after a catastrophe. So we show our prospective farmer clients the benefit of formal insurance." (45E)

   But this awareness was not limited to the end-user but also extended to executives of large firms who can benefit from innovating for the large base of the pyramid consumers:

   "If there is one thing I would, that is to make executives of large organizations aware of the opportunity in large BOP population markets. As CEO of the company I ran, I would now go back and have a project team working on for instance cookstove combustion, not just to fulfil the need, or opportunity for profit, but to learn from new contexts and constraints." (41M)

And awareness of these opportunities to innovate for unconventional markets through courses on frugal innovation was used to convince more students to pursue engineering education:

"Unfortunately most students in engineering have backgrounds where family members are engineers. We think frugal innovation courses and projects help to attract the otherwise non-standard crowd. So such projects help to convince regular common students and not just techies interested in gadgets, to be attracted to engineering as a career option. Even I thought engineering was about building cars or bombs." (40F)

The above awareness to the student community is supported by another entrepreneur's narration in his/her application form:

"We created a model for student activism and engagement that moves alongside this generational trend by focusing on how students can take positive action through education and action in their local community. We raise global awareness among young leaders through educational seminars, leadership summits, town hall meetings, opinion pieces, and global videoconferences." (2007s47)

Advocacy, according to the entrepreneurs' application forms, extended to enabling more investment in long term development:

"Advocacy with donors to convince them to look at longer term impacts of investment in capacity building." (2007s66)

And another entrepreneur described how users can help with distribution efforts through advocacy:

"By involving the women as active participants in the distribution, they not only have the opportunity to earn much needed income, but they become strong advocates of the products, selling to their natural networks of family, friends and neighbors." (2011s17)

II. Build structures

The second order category of 'build structures' came about after first order codes were coalesced into a common theme that related to structural issues. These issues emanated

from concerns for unstructured approach to innovation, gaining legitimacy and using a sense of empowerment and partnerships to build structures where little or none exist, such as the protection and dissemination of intellectual property.

5. Unstructured : Respondents believed that the innovation processes in the West or developed markets were more structured than those in the East or developing markets. An entrepreneur described how she found it difficult to show investors in Silicon Valley the complexities and uncertainties of developing market contexts particularly within the structured methods entailed in business plans and models. Notice here how aspects of context from the previous theme feeds into this next theme:

   "In relation to the formal processes in 1st world it is difficult to layout the complexities of developing country contexts to investors. Even the processes of business model and business plans are too structured for developing context complexities and uncertainties." (13E)

   In describing innovation in India, a mentor mentions people are creative but in an unstructured way. This unstructuration seems to enable a way of innovation that both stems from the complex and uncertain nature of these environments and makes the most of whatever is on hand.

   "In India innovation is at the grassroots level as in the case of Jugaad, a term that denotes making do with whatever resources are on hand. One common practice is to reuse a water pump engine for another unmeant purpose like a rural van. Or like the clay fridge. So people are creative, however in an unstructured way." (36M)

   A programme administrator corroborated this by explaining that while established structures meant accepted methods such as market surveys or focus group were available and acceptable in developed market contexts, carrying out similar methods in developing countries where cultures differ incurred added complexity and costs. Again, notice how the construct of culture from the previous theme of boundary issues feeds into this theme on building structures:

   "It becomes quite expensive to innovate for the BOP because of rural access, cultural interpretation, and language. E.g. tribal leaders have to give authorization for access to

village people. In contrast, in the developed countries one can quickly contract out a market survey or focus group research to get quick product feedback." (20F)

However, the following narration from an entrepreneur suggests that moves towards more structured regulation could be detrimental to their mobile money business model. He/she therefore is taking measures to help shape and structure the new regulatory frameworks:

"A primary risk to Kopo Kopo's success is regulation – as Central Banks and other relevant agencies institute policies such as capital requirements, Kopo Kopo's ability to do business could be affected. This is made more burdensome by the fact that Kopo Kopo is operating a service in several different countries. To counter this, Kopo Kopo plans to identify and engage industry experts, build towards the highest international standards, and advocate for appropriate regulatory frameworks. As stated earlier, Kopo Kopo's growth may be restrained by regulatory burdens as the mobile money markets mature." (2011s18)

6. Legitimacy : As a follow-up to the need for building appropriate structures, respondents divulged how they were concerned that their ideas and business models were either unacceptable to investors or to the consumer context. To make their efforts acceptable, they sought to build structures that helped legitimate their ideas and pursuits. For instance, entrepreneur 11E cited earlier, described how she was unable to sell or even distribute for free sanitary pads because they were considered a taboo. She had to institute legitimacy through awareness and advocacy to create an acceptance of sanitary pads in an environment that was not structured to adopt sanitary pads. This again shows how the first theme of boundary issues is related to this theme on building structures:

"We are focused on advocacy and training to raise awareness of taboo issues (women sanitary pads). Once the awareness is created, individuals naturally seek out sanitary pads. We cannot even donate pads in an environment where they aren't culturally or socially accepted." (11E)

But concerns for legitimacy extended from consumers, to investors, and the wider public. A programme instructor remarked that some firms are delving into social entrepreneurial endeavors as a means not only to lower price for efficiency purposes but also to build their image or gain legitimacy among consumers for causes greater than just making profits:

"It is not just about low price, but many of the energy firms are investing in building their image." (1F)

Similarly, an entrepreneur is working to gain legitimacy by being recognized as an international standard:

"(Our goals is to) Become a recognized international carbon standard." (2011s24)

Some entrepreneurs though gain legitimacy by circumventing regulatory hurdles. The following quote from an entrepreneur reveals how he/she perceives circumventing existing government operating licenses by creating explosives with thresholds lower than those required for licensed operation:

"This low grade explosive (1.4s) requires no license to operate and almost entirely eliminates the dangers of fly rock encountered with traditional explosives." (2006s110)

An investor explained that many social entrepreneurial projects would simply not meet the requirements of Silicon Valley investors, something he called the 'sniff test'. Even though there was potential for economies of scale, there was little legitimacy for such ventures or they were simply not being presented by social entrepreneurs in a way that was conducive to mainstream investors:

"Unfortunately as an investor now, I don't see traditional VCs investing in though the applications could enjoy economies of scale. They would just not pass the 'sniff' test." (27I)

This lack of legitimacy was supported in archival documents:

"(There is) Lack of confidence from the private and public sector in USA and Europe." (2011S3)

7. Partnerships : Social entrepreneurs use partnerships for varying purposes. Partnerships could be used to build a more structured approach to innovation concerns but also to help build access to customers through new distribution networks where infrastructure is unavailable or

insufficient to provide access to customers. However I kept it in the purview of 'soft' institutional voids as most of the data reflected this aspect. This construct links the soft concerns of institutional voids to the hard concerns of institutional voids. The following quote supports the idea of overcoming distribution challenges by partnering with those organizations that have inroads to these difficult to reach consumers:

"Partnerships are however very useful with NGOs in creating awareness and to develop distribution network in remote areas where NGOs often have access to." (22E)

The need for partnerships is supported by archival data where one entrepreneur writes:

"(Challenge is) Finding and attracting the right partners to help lead our organization's new direction and product focus.) 2011S11

And social entrepreneurship endeavors may use partnerships to be made aware of the opportunities for needy and implementable projects:

"Over the years, Engineers w/o Borders and other initiatives have made aware of projects around the world. For instance in Elsavador and Nicaragua we do projects where SCU has Jesuit partnerships. These relationships and partnerships are crucial for our projects' implementation & success. (40F)

But beyond distribution, others believed, as shown in the next two quotes, that new structures were being put in place or built by bridging or partnering disciplines and departments:

"It is an effort to engage the rest of the university mainly engineering and the business school." (15F)

"Frugal innovation is a nice effort to partner technology with entrepreneurship to come up with novel solutions for social problems that are both chronic and acute problems." (34F)

All types of partnerships are not welcome though. An entrepreneur explained that while some partnerships, particularly local ones are feasible, others which are global in nature are time and energy consuming:

"Because we are a startup we can't afford to invest in time and energy in collaborations with the frugal innovation lab here or others like MIT lab. I'd rather do it myself or with local partners." (51E)

And another entrepreneur writes in his application form that risks and complexities involved in building and maintaining partnerships:

"Furthermore, Kopo Kopo may encounter partnering risk, where partners might be adverse to interoperability. This is core to Kopo Kopo's value proposition, insofar as an institution might want to be able to offer their customers mobile payments on any network. To ensure interoperability, Kopo Kopo plans to create incentives to promote openness, avoid exclusionary partnerships, and accommodate varying degrees of integration." (2011s18)

8. Empowerment : The importance of a sense of empowerment was divulged by several respondents. An entrepreneur described the goal of transmitting skills to homeowners to help his/her clients become builders themselves.

"Build Change empowers homeowners to design and build themselves with technical assistance. Build Change works with local builders to incorporate disaster-resistant building techniques that are easy to adopt with limited training and education." (2011s58)

The Aravind hospital considers all their patients to be empowered, even those that make the choice of not to be treated, is seen as an empowerment of choice:

"The hospital values dignity as well as quantity. Poor consumers don't have the liberty to take economic risks, so they have to make a final choice or none at all, which one has to realize is a choice too!" (33M)

Entrepreneurs were described by a mentor as being particularly endowed with a send of empowerment by assuming responsibility for their action or even inaction:

"In large organizations often it is not about mission, but rather about position. This mindset makes innovation difficult in large organizations. Entrepreneurs on the other hand never say 'it isn't my problem'. They own responsibility for all issues in the venture." (41M)

And beyond himself, an entrepreneur sought to empower his target audience of farmers with the same send of empowerment so as to have collective bargaining power:

"The selling power of the farmers organized in to Producer Company results in a stronger negotiation power." 2011s25

9. Intellectual Property : The social entrepreneur community had contrasting approached to intellectual property. Some pursued strong IP protection while others believed in a open source scheme. The following entrepreneur described his closed IP strategy and legal efforts to stem infringement:

"I aggressively patent and have initiated nine lawsuits against Chinese copiers. I've had copy cats trying to sell to my own main customers at $3.60 versus my price of $5.20. Neither the patenting or the legal proceedings are very difficult or expensive in China, but very much worth it and necessary." (25E)

However, another entrepreneur believed that IP protection can be ineffective given the lack of institutional mechanisms in certain contexts necessary for protective IP strategies to flourish:

"Furthermore, enforcing IP is a difficult matter in countries where corruption is prevalent or where a large informal production sector exists, which cannot be effectively discouraged from copying products using legal means." 2006s111

The following two entrepreneurs approach to IP is governed by their ideals for social improvement and distribution and replication of their business models. One revealed that although he may license the business model, his belief and outlook to do good dissuades him from protecting and litigating against infringers. The second wishes to distribute and replicate the business model freely to achieve lower costs for the technology and therefore make it more accessible to the poor:

"It is possible that we could patent our system for online p2p microfinance. For instance, in the early days of the internet, a man patented online auctions and won a huge settlement from Ebay. Kiva will pursue a patent only for defensive reasons. It is against Kiva's ideals to offensively litigate against another organization, seeking to do good in the world, however. If awarded a patent, we would be very free in terms of licensing it to others in the space." (2006s128)

"IaW believes that all its technologies and ideas that benefit the poorest in developing countries should be licensing free. It is more important to reach out and make the technology affordable to everybody." (2007s77)

5.3.2 Institutional voids (hard)

III. Access provision

This theme builds on the previous theme by addressing the concern of getting the solution to those who need or desire it. It includes first order codes of distribution and supply chain. The following quotes show how partnerships, culture and context that fall under soft institutional voids are taken into account when considering challenge of logistics and infrastructure which in turn fall under hard institutional voids (arrow A in table 5.7).

10. Distribution : In many contexts, particularly those in developing countries, social entrepreneurs are concerned with delivering services and products over decrepit or insufficient hard infrastructure such as roads, ports, and transportation systems. I call these hard institutional voids. The following entrepreneur instead seeks to use alternative and existing infrastructure of water ways in Bangladesh:

"There are not enough road networks to cover the rural communication in developing countries and still these areas are only accessible by boats. Therefore water ways play an important role in the communication system of 'have-not' countries." (2006s135)

According to a mentor, even multinational firms have not been able to surmount the challenge of distribution for the bottom of the pyramid:

"GE's Healthy Imagination Initiative has not succeeded in reaching rural areas -- it has reached middle income towns but not the BOP." (2M)

An entrepreneur explained this challenge could be overcome through various ecosystem changes:

"This challenges us to reshape the ecosystem where finance, culture, behavior, and values all matter. So successful distribution is and will be the real source of my frugality." (56E)

Along the above lines, some entrepreneurs are building new business models to overcome distribution hurdles as in the case of Solar Sisters which seeks to create delivery and distribution chains for solar electric lights. The challenge here for the entrepreneur isn't the product or service, but getting the solution through the last mile of distribution:

"Solar sisters is a low cost and simple delivery model of frugal innovation to get products to users." (10I)

"It is the 'Sister' in Solar Sister that is innovative – using a women-centric sales force to distribute the solar lights is the best, most effective way to introduce the technology into the households. Other organizations focus on the technology, which frees us up to focus on the last mile distribution." (2011s17)

11. Supply chain: Although distribution is a concern, social entrepreneurs are concerned about the whole supply chain. An entrepreneur mentioned that initially they were focused on product focused design, but once that was solved, they then moved to redesigning the value chain:

"We were both design and RnD and production focused but now we have the money and proved the design, we are rethinking the rest of the value chain." (25E)

This is corroborated by another entrepreneur who writes in his application form:

"We strive to 'own the customer' by providing innovative options for each step of the business process, from product procurement and sales, through to servicing and end financing. By creating this all-inclusive business model, ONergy is able to provide both high quality and affordable options to customers, thereby maximizing social impact for those at the BOP." (2011s28)

Another entrepreneur writes that they focus on the service and maintenance component of the value chain. He believes the availability of spare parts and other facilities in certain contexts is too often neglected:

"Many failed economic development programs create long supply chains resulting in spare parts and repair facilities that are either nonexistent or unavailable where they are needed." (2006s119)

To help address some of these supply chain concerns, an entrepreneur explained that frugal innovation specifically is an effort to remove steps in the supply chain and replace with processes that use local content, material, and labor:

"To me frugal innovation is the IDE and Paul Pollock's of this world who seek to cut out a lot of the steps in the supply chain by using local content, materials, and local labor." (25E)

5.3.3 Resource constraints

The first order and second order themes detailed in this section relate to resource constraints. The second order themes identified were the *scope of solution, tone down or provide a satisfactory solution, and improve performance or efficiency*. As per the conceptual framework based on value chain, all the constructs here addressed resource scarcity upstream of the value chain. I say mainly, because I find that although I place them within resource constraints as faced by the innovator or firm, the issues relate downstream to how the needs of affordability constrained consumers are met. This thematic linkage from one analytical constraint to the next is reflected in the arrow C shown in table 5.7.

But note the previous constructs of distribution and supply chain within hard institutional voids also matter to the way they affect how a product or service is designed and eventually serviced (arrow B). This linkage suggests an overlap of institutional voids with resource scarcity.

IV. Scope of solution:

Towards understanding innovation under resource constraints, respondents described the scope of the solution they were providing. The first order codes that addressed the scope of solution include product, service, design, and servicing.

12. Product: The following quotes describe the focus on products as part of the solution. The following two quotes from archival data show the focus on developing new products:

"(We) Design /Develop /Manufacture/ Sell/ Install Innovative community kitchen stoves to replace petroleum gas with biomass." (2007s86)

"Build Change builds earthquake resistant houses in developing countries and changes construction practice permanently." (2007s58)

A programme member described frugal innovation as new types of products that social enterprises develop:

"So I see frugal innovation as better engineering products that social enterprises need to develop." (15F)

But a mentor mentioned that just focusing on redesigning existing products is inadequate. He drew lessons from the One-Laptop-per-Child organization whereby it missed the opportunity in mobile technologies while focusing on redesigning existing laptop designs:

"Cost reduction innovation of existing products doesn't work. Take the example of OLPC. It hasn't achieved its target price and it is losing time to cell phones, the latter being more simple, yet powerful and ubiquitous. Simply reducing cost of existing products won't work." (19M)

13. Service: The scope or nature of solution also expands to services. The following two quotes from archival documents describe the core offering being service-based:

    "Maid in India offers a comprehensive service package to both maids and employers." (2011S9)

    "(Our mission is) To provide Emergency Medical Service (EMS) to every one regardless of their ability to pay. Owns and operates the first standalone, private EMS in city of Mumbai and aims to be the national EMS provider." (2007s105)

    An entrepreneur explained that their offering is often misconstrued as product-based. But the reality is that the product is only a fractional cost of the entire package which includes media content that makes the overall solution feasible:

    "Some people talk about the need to drive down the cost of our product. But although our end user and beneficiary are the kids and teachers, the buyer or customer is actually the schools, ngos, and government. Plus the $60-80 cost of the radio is only a portion of the total $250 of the package. The main chunk is the content or media (services)." (51E)

    In bringing up fugal innovation again, an entrepreneur described software based services as opportunities for her to gather useful data about her clients:

    "Frugal innovation could be useful for us in collecting data to populate our database. We need SMS apps to be very user friendly. If we send too many SMS then it could cost too much to the end user to reply to our queries." (42E)

14. Design: Design approach or design thinking came up as a process by which social entrepreneurs institute improvements in products and services. A mentor and entrepreneur described this as a means to come up with quickly testable solutions:

    "I use design thinking to setup new micro-franchise businesses such as ideation and prototyping, microlight marketing, and quick and dirty proofs of concepts." (32M)

Another entrepreneur explained how she and her team used an iterative approach to design by going back and forth between the field and the lab:

"I agree we cannot design in isolation of the USA for developing country applications. Our cookstove was first developed by Engineers w/o Borders at Berkeley. But our engineers went back and forth to Sudan and worked with a local engineer. Through this back and forth our cookstove went through 14 iterations and we reached the current price of $16. So I don't think we designed and developed in just Berkeley and just dumped the cookstove, rather we tweaked it over and over again as necessary." (46E)

Needs assessment, iteration, and quick and dirty proofs of concepts which are features of design thinking process came up again in archival data from another entrepreneur's description of their activities:

"Without doubt, innovation and creativity are our biggest strengths. Kamworks has a core team of multiple award winning creative minds and out –the-box-thinkers. Our unique location (1 hour outside the capital, in the rural areas) in the middle of our target group allows us to test ideas and prototypes whenever we want, leading to participatory designs with villagers." (2011s43)

For the above techniques to be possible however there is a need for design professionals with skills in design thinking for development:

"As organization grows, finding design professionals who believe in our mission of applying design for development purposes using renewable energy." (2011s19)

15. Servicing: In addition to designing the solution, the concern for servicing or maintenance arose. As shown in construct 11 on supply chain, many of the end-beneficiaries or users are located either in remote areas where they do not have access to repair centres or workshops, or don't have the means to afford formal repair facilities. Construct 11 on supply chain from the analytical theme of hard institutional voids feeds into this construct which falls under resource constraints (shown as arrow B in table 5.7). One way social entrepreneurs deal with servicing and maintenance is to create a local value chain:

"Our main product, the rope-pump, linked to a leasing system is innovative for Cambodia. The pump is the first manual water pump in Cambodia that is made of materials to be found in every Cambodian market so that the spare part supply chain is already in place." (2007s77)

Another way social entrepreneurs see overcoming supply chain gaps is to create local franchisees. Quotes from the following two entrepreneurs describe how they develop local people and train them to maintain and service solutions:

"A local person is trained to service the units and to liaison with the company on usage stats. The person is nominally paid and hired to serve that role." (35E)
&
"BGET's approach includes village franchisees that will be our local contacts. Our customers can inform the franchisees directly if they have problem with their solar home systems. Our systems are also under warranty and customers can pay for the equipment over 1-2 year period." (2011S8)

And two other entrepreneurs explained that during the design process, they try to design the solution in a way that makes repair easy for clients in rural areas:

"Our product is pretty sophisticated inside using MCU (microcontroller units) but I do try to design it in a modular fashion which makes replacing parts easy for schools in rural areas." (51E)
&
"Robust, simple and appropriate, they (solutions) can be easily maintained at village level and repaired using locally available materials and skills." (2006s111)

In building this local capacity to service and maintain, a programme faculty member explains global capacity and supply chains cannot be relied upon for long term servicing and sustainability. (This point links to construct 30 later on capacity building and value generation). Servicing and maintenance is a concern for social entrepreneurs when functioning in developing markets. And the way to address this concern would not be very different from the way local capacity over the years was built up in what are now advanced markets that have achieved long term servicing and sustainability:

"Even the US, with its mass production systems has built the local ecosystem capacity to achieve long term sustainability and servicing." (52F)

V. Tone down / Provide satisfactory solution:

In staying with the overall focus on resource constraints, and in moving beyond the scope of solution, a related second order theme that emerged was the toning down of solutions to provide satisfactory performance. Some argued a solution needs to be simply good enough, through making do, and a de-sophistication approach. While others argued it was about achieving major improvement in performance and / or efficiency (next second order theme). I outline here the first order constructs that support the former.

16. Good enough: A corporate designer and engineer described how in the corporate world the pursuit of perfection and top performance is not particularly important in all circumstances. This awareness came about from competition by One Laptop per Child to which they responded with good enough performance, but at a much more affordable price point:

"What we (at Intel) learned from impending competition from OLPC was to redesign the processor for low cost net-books with good enough performance. So yes the West can learn from technology application in developing countries". (4E)

An investor described that he doesn't look for the most optimal solution, but rather a good enough solution provided the team implementing it is fully capable and on board on the idea:

"Even if the solution is 80% right, but with 100% focus and with team fully on board, you can succeed." (27I)

A programme member described that many of the social entrepreneurs try to avoid redesign where possible by using technologies which are good enough, though suboptimal. After some success however, then there would be more effort to improve the design of that suboptimal solution:

"Most of the entrepreneurs here aren't looking to redesign but to use existing suboptimal technologies. When they achieve some success perhaps then they will look to formally and frugally innovate." (37F)

The following narration from archival data supports the above by showing how an entrepreneur took small steps in execution and action by first starting with sub-optimal solutions which paved the way for their current success:

"Operational Mind: Kiva was able to go from a concept to a well-known reality in a short period because of an ability to translate ideas into action. We take a very pragmatic approach to every problem and like to see progress made every day. We emphasize daily execution over more esoteric approaches. Lately, I have heard from many people who have had a similar idea but were never able to get it off the ground. Kiva was able to start because we chose a small village in Africa and we made a small website in America. Now, both the village and the website have been elevated to a higher level thanks to a "just start" mentality." (2006s128)

17. Making do : Towards coming up with good enough solutions, a common theme of how this was done was reflected in a make do attitude. This make do attitude can encompass using whatever resources and technologies or infrastructure are available and accessible. One entrepreneur who described using household tools to disinfect sanitary pads:

"All tools are sourced locally, even the ultraviolet and 'pressure cooker' steam disinfectant which have other uses in the region." (14E)

Another entrepreneur described that even old and presumably defunct technologies could be useful in some of the contexts they work in:

"In fact we are considering using older technologies like the voice modems of the 80s to allow our target schools to download data over the radio analog network." (51E)

And still other entrepreneurs linked construct 10 on distribution efforts with making do by relying on existing infrastructure instead of having to build or create new distribution

infrastructures. The following two quotes from archival documents further support arrow B in table 5.7 which links hard institutional void concerns with resource constraints.

"The Hapinoy Store program organizes micro-retail outlets called 'sari-sari stores' at the base-of-the-pyramid. What is unique about the approach is that it builds upon a human network of 600,000+ sari-sari stores already present in every village in the Philippines. Thus, no new infrastructure is needed, only an innovative model that is able to harness the power of this largely untapped system. And because it's existing infrastructure, Hapinoy can expand modularly and in a scalable manner, as opposed to an approach which tries to build the new infrastructure." (2011s37)

&

"Scojo's innovation lies in its micro-franchising concept of marketing and distribution of high-quality, affordable reading glasses which overcome the barriers. Scojo has created a "business in a box" which enables individuals living in poverty to easily start their own business and more than double their monthly income. As mentioned above, Scojo Foundation's micro-franchise technology allows Scojo to identify large existing network of providers and simply integrate its products and services into their systems. This makes replication and scalability more feasible since a large infrastructure does not need to be created. We have demonstrated this approach with many partners (mentioned above)." (2006s132)

Notice both above quotes suggest that using the approach of making do with existing infrastructure for distribution allows for greater scalability. Scalability is construct 23 which I introduce later. This linkage supports arrow C in table 5.7 which indicates a relationship between issues of resource constraints with those of affordability constraints.

The process of making do was labelled with the Indian word of *jugaad* by a mentor, a word which is sometimes translated into frugal innovation. However, the mentor cautioned that social entrepreneurs may use *jugaad* to benefit from making do, but not to the extent that it would hinder further improvements or undermine quality:

"We do jugaad to the extent of making do with what we have, but not to the extent that we let jugaad hold us back on quality delivery." (33M)

This approach to making do by using whatever is available is supported by the following two quotes from the archival data of entrepreneurs:

"Alternative local products can also be used e.g. clay pots with cover for water security units and empty cartons for waste baskets." (2007s72)
&
"The system is activated remotely by either lanyard or a low volume pressure pulse supplied by everything from standard bicycle pumps to industrial compressed air sources." (2006s110)

18. De-sophistication / Simplicity : A related first order theme was removing complexity, prevalent in contemporary practices, towards achieving more de-sophistication and simplicity. Many social entrepreneurial solutions are less sophisticated, perhaps because of the nature of developing market contexts.

A faculty member succinctly explained that practices in the West, such as in Silicon Valley, are more about high tech sophistication:

"*Non frugal silicon valley is all about high tech sophistication." (39F)*

Another respondent elucidates on the notion of frugal innovation, that it is about de-sophistication and common sense and cites the example of NASA spending millions to develop a pen that works in zero gravity when they could have just used a carbon pencil:

"Frugal Innovation is about design for social problems, needs and contexts such as supply chain and lack of infrastructure concerns. It is all about common sense and de-sophistication. Recall the NASA ball point pen for $5m versus a $1 pencil." (8F)

In contrast, social entrepreneurs remove complexity to replace with simplicity:

"(Our) Belief: There is a simple solution to every problem. Solutions become complex when the problem is not understood." (2007s57)

An entrepreneur corroborated this assumption by claiming that it is the simplicity of her business model which is a strength that enables her to achieve high scale (more on scaling as a construct later):

"The Solar Sister model strength is that it is very simple and this simplicity enables it to be scalable from tens to thousands of women entrepreneurs." (6E)

An investor elucidates that given this contrasting approach of high and low sophistication, it becomes difficult for Silicon Valley investors who are used to high sophistication to invest in less sophisticated business models and solutions:

"However even impact investors have a difficult time investing in developing market low sophistication and low cost innovations." (10I)

VI. Improve performance or efficiency:

Others however believed that despite resource constraints, high performance and improved efficiency was needed to surmount the challenges of meeting the needs of consumers despite resource constraints. This notion was starkly different from the make-do and good-enough approaches outlined by some respondents.

19. High performance : An entrepreneur related that in Silicon Valley performance improvements are understood through concepts such as Moore's law which stipulates incremental improvements over time. But in unique or extreme contexts that he functions in, he needs to innovate radically and differently to leap or jump to a far better approach than existing solutions:

"Here they rely on Moore's law to increase performance and lower prices. However in areas where I function, you need to do more than just that." (51E)

And entrepreneur described their approach as the best in terms of safety, economy and precision:

"Its portability empowers those working in remote areas and allows the demolition of rock or masonry in almost any location with a level of safety, economy and precision not available from any other system we are aware of." (2006s110)

In describing frugal innovation, a faculty member described that it is about using the best technologies to leapfrog and radically innovate to maintain high quality but at much more affordable levels:

"Frugal innovation is about jumping or leapfrogging alternative solutions to use high tech and high quality but at affordable levels." (43F)

So innovation for social entrepreneurs, such as frugal innovation, isn't just about reduction of costs, but also about high quality:

"By creating this all-inclusive business model, ONergy is able to provide both high quality and affordable options to customers, thereby maximizing social impact for those at the BOP." (2011s28)

Similarly, a mentor described how mobile phone companies have leapfrogged traditional banks even in the remotest parts of Africa:

"One gets amazed at the way cell phones have leapfrogged with mobile banking in Uganda even in the remotest of areas and the banks don't even know what passed them." (49M)

20. Improve efficiency: Another perspective on dealing with resource constraints stemmed from the concept of efficiency, and in improving it. An entrepreneur mentioned that frugal innovation specifically is about improving efficiency in the way something is solved:

"To me it (frugal innovation) is about solving a problem in the most efficient manner possible." (46E)

A programme administrator and mentor described that improving efficiency is an important offering by social entrepreneurs if they wish to be more relevant for investment by mainly Silicon Valley investors. If the social entrepreneurs can show they can improve efficiency,

they show they can scale up by using fewer resources and also have more room to play with margins:

"Cost per outcomes are an attempt by social ventures to be more financially relevant to investors. Reducing the cost per outcome also exhibit scaling up potential since one can do more with little." (1F)

Archival documents from entrepreneurs corroborate this notion of efficiency improvements:

"We are researching management information (MI) systems to improve efficiency by created a streamlined data collection process that is easy to use and aggregates data." (2011s23)

"We are of the firm belief that our market orientation is an open one and our intervention is one of the most efficient ways to create ready-market for rice produce in Ghana and in the West African Sub-region." (2011s34)

5.3.4 Affordability constraints

The first order and second order constructs divulged here address affordability constraints. The second order themes were *resolve needs and meet aspirations, reach out, and develop capabilities*. Again as per the value chain conceptual framework, these themes addressed affordability constraints which are one form of resource scarcity mainly downstream of the value chain. But the upstream concerns shown in the previous section linked to the constructs presented here (link depicted by arrow C in table 5.7). For instance the construct of high performance linked to the needs at affordable levels as well as the aspirational desires of consumers. Also, the construct of improving efficiency linked to the scaling and margin constructs of this section. And in a circular fashion, this analytical constraint linked back to the first constraint of soft institutional voids by common issues and concerns as divulged in data and reflected in arrow D in table 5.7.

VII. Resolve needs and meet aspirations

This theme of resolving needs of consumers and meeting their aspirations is a goal or mission by social entrepreneurs despite or perhaps because of affordability constraints faced by users.

21. Needs: The needs of users and consumers came up repeatedly. This was a basic pretext to why or for what the innovation was for. Several social entrepreneurs in the archival documents wrote of delivering solutions for the "needy":

    "(We) Create sustainable solutions to help the needy." (2011S9)

    But it is not just serving the "needy", but also figuring what they need. A programme member argues that innovation should not be about lowering price but be more concerned with responding to the needs of particular users:

    "As a marketing person I think it is understanding needs and not just making it cheaper or affordable." (8F)

    Another programme member acknowledges that the user needs in contexts vary which is why understanding the needs of people in those contexts is important. She goes on to explain that certain solutions built on platforms that exist in some markets would not exist in others:

    "The user needs in developing markets are very different from those in Western nations, so we must place utmost relevance on defining user needs. Even the platforms, to use computer engineering language, would be different or none exist." (40F)

    And similarly, archival documentation supports the above value of understanding and addressing user needs:

    "We design research programs and products which are driven by the needs of the development programs or agenda that we participate in with partners." (2011s35)

22. Aspirational : While needs are important, other social entrepreneurs believed that aspirations are just as important to consider. An entrepreneur mentioned that many of her customers actually go beyond their needs and reflect their aspirations for high status:

*"My colleagues here agree that a lot of customers are looking to go with high end products perhaps to be **aspirational** and high status." (28E)*

She further provided the example of her customers vying for the more costly solution but is not sure why they pursue the more expensive one – for needs or aspirations:

"Most of our customers prefer the more expensive $50 D.Light over the $5 one. Perhaps it is a dual purpose with cell phone charger." (28E)

The following entrepreneur mentioned how they enable their target audience to pursue their own aspirations. This assumes that aspirations may already exist among users:

"Trees, Water & People (TWP) uses a unique model of non-profit incubation, characterized by long-term collaborations with our partners that permits them to diversify their skills, grow their management capacity, pursue their aspirations, and actively test assumptions around regionally appropriate sustainable technologies." (2011S1)

But where aspirations don't exist, there may be a need to create them. For instance, an entrepreneur cited earlier under construct of "awareness / advocacy" explained that she creates aspirations among her target market before even trying to meet their needs – for if the aspiration to desire such a solution doesn't exist, even efforts to give away the product for free would not avail to much:

"We are focused on advocacy and training to raise awareness of taboo issues (women sanitary pads). Once the awareness is created, individuals naturally seek out sanitary pads. We cannot even donate pads in an environment where they aren't culturally or socially accepted." (11E)

The following entrepreneur mentions both needs and aspirations of their user base:

"ONergy creates an ecosystem which connects technology, finance and grassroot organizations - to manage the energy needs, aspirations and resources of rural BoP beneficiaries." (2011s28)

VIII. Reaching out

In this second order theme, the main idea was to reach out to people who weren't being addressed. This second order theme is supported by first order constructs scaling, rectifying inequity, margins, inclusiveness, and affordability.

23. Scaling : This implied social entrepreneurs were concerned about growth and scale whether it was achieved by their own organizations or by someone else using the innovation or business model they helped foster. An entrepreneur explained that scaling up was more crucial for them than for purely business or commercial entrepreneurs:

"Our whole model rests on training in house and in large volumes. If a private hospital does two surgeries per day per doctor, then Salauno has to do ten in comparison." (44E)

An expert and mentor commented that the desire for scale up despite means to do so helped them to innovate in ways that helped them to be different from competition:

*"One such self imposed constraint is self-reliance. It sounds quite counter-intuitive to think "we don't have money, nor do we have access to it, but we want to be self sufficient". This helped create a business model which led Aravind to **scale** and differentiate from other eye care charities who had access to some funds but turned out to be a limiting factor for their growth." (33M)*

But scaling up particularly for the base of the pyramid customers isn't without its challenges:

"Our challenge will be to grow our customer base from less risk-averse residents that serve as our early adopters to the larger or majority market of more risk-averse BoP consumers." (2011s23)

One such challenge is described as balancing individual impact while aiming for global impact:

"The biggest challenge facing Solar Sister is balancing scaling the program to achieve impact and meet demand and maintaining the individualized support for each Solar Sister

Entrepreneur that will help her become a successful independent businesswoman." (2011s17)

The following quote was used earlier in support of improving efficiency, construct 20. But it also addresses scaling up by linking the ability to reduce cost per outcome with the ability to scale up. This quote exemplifies the linking of one second order theme and the next shown as arrow C in table 5.7:

*"Cost per outcomes are an attempt by social ventures to be more financially relevant to investors. Reducing the cost per outcome charts also exhibit **scaling** up potential since one can do more with little." (1F)*

24. Rectifying inequity: Respondents divulged a desire to resolve or rectify inequity by innovating for the target market. A mentor described how the poor's choice not to be treated is a choice which cannot be ignored. They therefore, treat their poor customers with the same dignity they provide to high paying customers, which helps to reduce some of the inequities they encounter:

"The hospital values dignity as well as quantity. Poor consumers don't have the liberty to take economic risks, so they have to make a final choice or none at all, which one has to realize is a choice too!" (33M)

The above quote was used earlier to support construct 8 of empowerment to build structures under soft institutional voids. But I have used it here to support treating the hospital's patients with dignity and to rectify inequity. This exemplifies the linkage shown as arrow D in table 5.7 which relates this theme under affordability constraints to the themes that address institutional voids.

This aim by social entrepreneurs to reduce inequities can be of various forms – such as the digital divide or educational divide:

"We are trying to bridge the digital divide and use the ICT tools as an advantage for the remote and economically poor communities." (2006s117)

"To promote mass-scale, formal education for the less-privileged children of Pakistan at the primary and secondary levels in an environment that encourages intellectual, moral and spiritual growth." (2007s98)

But despite efforts by social entrepreneurs, a mentor described how the mobile sector, through the development and diffusion of GSMA standards, accidentally reduced the cost of access to mobile communications across the board for all to afford. And it is the only sector which has enabled large multinational for-profit firms to innovate for the bottom of the pyramid thereby helping to reduce some of the inequities in access to communication:

"The development of GSMA standards helped to lower cost of technology for all to be able to afford. And mobile is probably the only sector through which MNCs have innovated widely for the BOP." (2M)

A faculty member further supported this construct by arguing their students should be designing for consumers in order to reduce inequities across the globe for both reasons of profit opportunity and for meeting needs of the underserved:

"A lot of students now realize they need to design solutions for the rest of the world not just for the USA because i) the markets are there for both MNCs and entrepreneurs ii) the Jesuit mission to help the underserved poor."(39F)

25. Margins : The data revealed that profit margins are viewed based on a number of factors and not just on maximizing return. An entrepreneur explained that their margins are based on the ability of her clients to afford the service, then competition, and on the basis of women entrepreneurs to profitably distribute their service:

*"Our **margins** are calculated based on i) affordability of BOP, ii) offers from competition, and iii) enough to make money for our women entrepreneurs." (6E)*

So margins among social entrepreneurs take into account the affordability constraints of their target market. But these lower margins may not be attractive for mainstream venture capitalists:

"Meanwhile, the markets we intend to focus on are characterized by cash-strapped clients (be they the poor or the majority of NGOs). While a degree of profitability can be achieved, the margins are insufficiently high to be of interest to ordinary venture capitalists that do not take our humanitarian return on investment into account." (2006s111)

A mentor explained that traditional venture capitalists are very harsh on the expectations of margins they negotiate with social entrepreneurs:

"Most term sheets from VCs to our type if impact businesses will make even the VCs brush on how harsh they are on the social enterprises." (2M)

So an entrepreneur described the challenge of moving away from profit maximization, which hurts consumers with low affordability, and yet reconciling that aim with enabling enough margins for everyone involved in the value chain:

"A challenge is how we move away from maximum margins to reasonable margins for all in the value chain." (30E)

Towards cross linking themes, the following quote was also used also to support construct 8 of empowerment. But in this construct it relates to addressing reasonable and fair prices and margins for farmers and therefore supports arrow D in table 5.7:

"Nirantara Livelihoods ensures that farmers receive realistic prices for the produce of their farm. The selling power of the farmers organized in to Producer Company results in a stronger negotiation power." (2011s25)

26. Inclusiveness : This construct has similarities to rectifying inequity, but while the latter seeks to resolve differentials, this one suggests removing notions of exclusion. Aravind hospital's motto reflects the inclusive approach:

"In terms of capital resources, money is probably the easiest part of setting up eye hospitals. If you put in enough money you could create 20 hospitals, but they probably would not have the same ethos: Providing vision to all, and seeing all as one." (33M)

An entrepreneur described her efforts to be contributing to social inclusion:

"To produce and commercialize quality green coconut husk derivatives, giving a strong contribution to social inclusion of communities who suffer from risk situation and also improving Fortaleza environment conditions during this process." (2006s113)

When an entrepreneur's goal for inclusiveness was in danger, he showed dismay at the effort of his mentors to have him shift to a more lucrative target segment:

"I am dismayed that the feedback through the GSBI programme is making us let go of our impact oriented BOP segment in favor of a more business worthy higher mid-segment." (23E)

In the following quote, a faculty head believes that although lucrative research grants have a place, so do more humble projects that are often otherwise neglected:

"Research 1 universities are more focused on gaining the NSF grants awarded to large sophisticated projects. We have a more humble approach as we focus on helping the underserved." (52F)

The following quote was used earlier to support construct 19 of improving performance. Here it also helps to support inclusiveness, thereby further exemplifying the cross-thematic linkage show in arrow C in table 5.7:

"By creating this all-inclusive business model, ONergy is able to provide both high quality and affordable options to customers, thereby maximizing social impact for those at the BOP." 2011s28

27. Affordability : As probably already witnessed, the construct of affordability repeatedly arose in constructs and themes discussed thus far. The ability to afford a product or service was narrated by several respondents. This was reflected in the missions of several shortlisted social enterprises:

"(Our) Mission is to 'ONergize' 1 million rural lives by 2015 by providing affordable renewable energy solutions." (2011s28)

&

"(We have) created the ability to access of BOP to private education based on: affordability, access, availability." (2011s45)

An entrepreneur explained how village households are unable to afford light for a child to study at night, which led her to focus on providing light to kids to enable them to attend school and therefore have social impact:

"Children drop out of school in these inner most remote schools because parents have to spend like 5-10cents on candle or kerosene every day. So to enable a child to study at night equates to 3-5 dollars expense on 30 dollars of monthly income." (35E)

A mentor and entrepreneur described that the bottom or base of the pyramid is so constrained by affordability, that a fractional cost reduction would be insufficient to achieve those price points needed for the BOP:

"I told GE that 10-15% cost reduction as being talked about means they are not serious in addressing the BOP. Instead they need a 10 fold decrease." (2M)

However, a programme instructor cautioned that reducing prices to achieve more affordability may not always be a good thing for all in the value chain. For instance, a farmer who sells produce may find his or her revenues dwindle due to a pursuit of reduction in costs:

"Sometimes cost reduction may not always be great. It may be good for the enterprise but not for the farmer who serves as a seller." (29F)

IX. Develop capabilities

In this last second order theme the concern was to develop capabilities for either the organization or the target market. Capabilities ranged from achieving economic sustainability, environmental sustainability, value generation/capacity building, and learning. As cited above, this theme linked the issues back to the first theme of boundary issues, building structures, and access provision. Capabilities have to be developed keeping into

account context and culture as well as strategies of globalization versus localization. This linking suggests an overlap of resource scarcity with institutional voids and this was expected given the simultaneous nature of these two broad constraints for social entrepreneurs.

28. Economic sustainability: Respondents showed that they were concerned about not just sustaining their own organization, but also helping their costumers or target beneficiaries improve by gaining economic independence and sustainability:

"This approach makes great sense at the time of farming distress in India and this would provide continuous and stable income flow to small & marginal farmers." (2011s25)

And another social enterprise showed how they provide stable income flow to maids who work in the informal sector and face the debilitating consequences of intermittent work:

"Maids get employed by the organization, and stay on the pay roll irrespective of us being able to place them or not." (2011S9)

A mentor described that he sees one of his challenges in supporting social entrepreneurs as providing means for entrepreneurship to the families they target.

"However now the challenge for us is to provide sustainable entrepreneurship for these families." (24M)

In the following quote, another mentor described that grants and handouts cannot be relied upon to achieve a sustainable solution to public concerns such as access to water. Instead, entrepreneurship provides an alternative means to sustaining economic viability of such provisions:

"The World Bank and such international organizations aren't doing enough, in fact they put strings such as privatization to basic human rights such as water, which isn't right. Entrepreneurship for such challenges is the path for charity and grants cannot be sustainable." (49M)

In continuing the point above, an investor supported the notion that even traditionally non-profit organizations are looking to reduce their reliance on grants and instead generate their own economic viability:

"Money is being changed in the ways it is deployed. Grants are great, but even nonprofits are moving away from grants to earned income." (48I)

29. Environmental sustainability: Another form of sustainability that emanated from the data was environment related. This was termed in the application form by an entrepreneur as doing the right thing:

"Ecologically responsible – using recycled materials to create new consumer products rather than filling trash dumps feels good. It is the right thing to do." (2011s33)

The following entrepreneur described the learning process by which she had to innovate to take into account cultural practices and not endangering the sustainable environment by the product she was introducing to it:

"Initially we imported pads but found that the pads were clogging toilets and were not biodegrading creating greater health risks. So we came up with a patent pending chemical less process to manufacture biodegradable pads. And the localization manufacture policy in South Africa and India helps to establish local manufacturing capability." (11E)

Similarly, another entrepreneur raised concerns for the detrimental effects to the environment:

"These methods require the use of high cost, energy intensive materials and skilled labor, largely unaffordable for the BOP. Following an extensive natural disaster the demand for these materials further increases the cost. They also perform poorly in severe weather climates and their production, transportation and use are harmful to the environment." (2011s31)

An instructor of the programme narrated evidence from Haiti to support the claim that a localized approach may be costly at the beginning, but over time it is both less costly and more sustainable, economically and environmentally:

"We use local resources, of the few available, to enable low cost and long term sustainability. Although initially the costs may seem high, over time due to self sufficiency and sustainability the end costs incurred are lower. There was an article in NYT about Haiti's reconstruction after the earthquake and it was an evaluation of the different approaches. The localized approach was not only cheaper but more sustainable." (52F)

30. Value generation / Capacity building: Similar to the first order construct of economic sustainability, here the understanding was that value for solutions is not limited to the service or product being offered. Instead it extends to generating more value for the client through for instance the capacity to make more money. Hence, capacity building and value generation were frequently discussed together. An instructor and researcher informed that value cannot be limited to the product one sells. However we know little about what this means or how it can be done in developing markets:

"So a key lesson is that you always focus on the long term value you create for the client, not just the product you sell. This will define your business model including pricing and production. However, it is difficult to say what this means for developing country social enterprises. We need more research in this. Some cases like e-Choupal show that you can't just take a product centric or service centric view, you have to do both within the value created through your business model." (53F)

Although saving is important, an entrepreneur believed she is able to convince clients on the use of her solution not through the cost-savings her offering provides, but by the opportunity her offering opens up to earn more income:

"The poor we serve are more interested in learning about how to make more money rather than on saving money." (25E)

But this learning the ability to make more money is termed as capacity building:

"The approach begins with an active stakeholder dialogue to refine technology development and dissemination strategies; it ends with technical assistance and capacity building to enable local businesses and organizations to implement Envirofit solutions long after we have left." (2007s67)

&

"To overcome those problem Padma have promoted the youth of farming community who are little educated (have ability to read and write Bengali & English) as knowledge broker. Those youth are rooted to the community and deeply accepted to the community. After having capacity building training they act as catalyst to bridge farmers with the system. That is the innovation I applied to overcame the challenges." (2011s15)

The following quote exemplifies the linkage between construct 8 on empowerment and construct 11 on supply chain with this construct on value generation, thereby exemplifying arrow D in table 5.7:

"To scale-up poverty reduction outcomes, IDE's strategic plan (The Plan) places an emphasis on empowering the smallholders not only as customers or end-users of supply chains, but also as producers and suppliers of agricultural goods and services. In this context, smallholders are fully integrated into supply and value chains. In fact, the smallholders are the central focus of this Plan and their success as value-adders in the supply of agricultural products is of fundamental importance in the respective market development activities." (2005s156)

31. Learning: In this second order theme, as part of developing capabilities, an ability and opportunity to learn is fostered. The aim of one entrepreneur was to foster this learning among the South:

"(We) Build the capacity of African development organizations, mostly focusing on increasing the sharing of South-South knowledge for the creation and dissemination of appropriate technologies." (2011s51)

A mentor described that the Aravind hospital has enabled others to learn from their model by which others do three times as many surgeries they do themselves. This suggests that this social enterprise is not concerned with loss of competitive advantage by sharing lessons and

learning with others, but instead seeks to foster capability development among other firms by transmitting knowledge and helping others to learn:

"On learning from us, we do 300K surgeries a year and have enabled others to do another 1 million a year." (33M)

A faculty member remarked that lessons from social enterprises could be useful for any firm wishing to lower costs, and therefore address affordability constraints:

"Although these lessons are from social enterprise, the lessons could be useful for all firms wishing to lower costs." (12F)

The following quote from a former CEO of a large corporation and now mentor at the programme was used earlier to support construct 4 on awareness and advocacy, again helping to support the linkage between this theme that addresses how to overcome affordability constraints with themes that addressed dealing with institutional voids (arrow D in table 5.7). The CEO encourages large firms to delve into socially entrepreneurial projects for the learning opportunity they provide:

*"If there is one thing I would, that is to make executives of large organizations aware of the opportunity in large BOP population markets. As CEO of the company I ran, I would now go back and have a project team working on for instance cook stove combustion, not just to fulfil the need, or opportunity for profit, but to **learn** from new contexts and constraints." (41M)*

32. Self-sufficiency: In this last first order construct that supports the second order theme of *develop capabilities*, the idea follows on from the previous constructs of building capacity, learning, and sustainability all towards becoming self-sufficient. This notion of self sufficiency is supported clearly by an entrepreneur who wrote:

"They implement projects that aim for community self-sufficiency and triple-bottom line returns for all involved." (2011S1)

The following quote was used earlier to support construct 23 of scaling. But this scaling was made possible because of being more self reliant or self sufficient:

"One such self imposed constraint is self-reliance. It sounds quite counter-intuitive to think "we don't have money, nor do we have access to it, but we want to be self sufficient". This helped create a business model which led Aravind to scale and differentiate from other eye care charities who had access to some funds but turned out to be a limiting factor for their growth." (33M)

Like Aravind which was able to do much more in the process of becoming self reliant, an entrepreneur mentioned in the archives that self sufficiency will allow them freedom to do more:

"Our greatest need is to break our dependence on donor funding. This will allow us: More freedom in our work and to serve a larger number of the people in need." (2007s102)

An entrepreneur believes individuals should be self sufficient in affording the solutions they need and not have to depend on handouts. He believes that NGOs which give out solutions freely actually handicap their business model:

"NGOs that buy pump at IaW often give the pump away which interfere with our believe that local people should pay for it." (2007s77)

This sums up the presentation of the qualitative data which supports the coding of 32 first order constructs into 9 second order themes. Several of the constructs and themes identified in this chapter are corroborated by existing literature. For instance, in support of the relationship between resource scarcity and my findings on prevalent use of partnership, DiDomenico et al (2010) find that social enterprises used stakeholder participation as a social networking strategy (Johannisson and Olaison 2007) to extend their governance structures and generate new contacts with those who could be source of resources. And the involvement of stakeholders such as users, regulators and resource providers or allocators in the innovation process is corroborated by prior research in innovation (c.f. Garud and Karnoe 2003; Von Krogh & Von Hippel 2003; and Shah 2006). These findings have been no

different for social entrepreneurial ventures. Through case studies of social ventures in India and in Costa Rica, researchers found the importance of stakeholder participation in the innovation process to help achieve successful project deployment (Tongia and Subramanian 2006; Braund and Schwittay 2006; Kuriyan, Toyama and Ray 2006). And the notion of localization for building local capacity, use of local content and local ownership exists in literature (Schumacher 1973; Braund and Schwittay 2006; Desa and Kotha 2006; Koch and Caradonna 2006; Tongia and Subramanian 2006). Similarly, literature can be cited to support many of the first level constructs and second level themes identified in this chapter. In consideration for space limitations of this dissertation, I shall instead focus on the three aggregate level themes.

In the next section I will outline how I used the linkages between these constructs and themes to identify higher order, third level theoretical dimensions.

5.4 Aggregating into third level theoretical concepts

In the fourth and last stage of the coding and analysis, the objective was to take the first and second order codes, and label the codes or dimensions based on emergent concepts or on existing ones found in the literature. Table 5.7 is a summary intermediate table which shows first order constructs grouped by second order themes on the left column and grouped by their relevance to institutional voids and resource scarcity on the top row. The table shows how the first order coalesce into second order and the second order coalesce into third level theoretical abstractions which are shown in the last row in the bottom.

The third level theoretical dimensions are based on existing literature and represent technology innovation (Schumpeter 1934), social innovation (Mulgan et al 2007), and

institutional innovation (Hargrave and Van de Ven 2006). I shall discuss these three innovations and their relationship to the analytical concerns of institutional voids and resource scarcity in greater deal in chapter 6. But note the three theoretical dimensions on institutional, social, and technology innovation are not mutually exclusive.

The arrows labelled B, C, and D in table 5.7 indicate overlapping concerns from one type of innovation to the next. Arrow B depicts constructs that identify with institutional innovation overlap with constructs that identify with technology innovation. Arrow C depicts constructs that identify with technology innovation overlap with constructs that identify with social innovation. And finally, the circular link shown as arrow D depicts constructs that identify with social innovation overlap with constructs that identify with institutional innovation.

<See Table 5.7, page 221>

In the next section I describe how this cross thematic and circular overlapping phenomenon hints towards the formulation of the model of innovation (2) under constraints.

5.5 Generating the theoretical model

One of the main objectives of this research was to create models of innovation as perceived by social entrepreneurs and under constraints of institutional voids and resource scarcity. The former model of innovation was outlined in chapter 4. The second model of innovation under constraints will be attempted here. To do this, I again found table 5.7 useful. Upon reviewing this intermediary table, I noticed the first order constructs related to and 'continued' into the next set of first order constructs that made up the next second order

themes. These are depicted by the arrows in table 5.7 which show how data from one type of constraint linked to another constraint.

I find that the construct of partnerships relates to both the soft and hard features of institutional voids (arrow A). And hard institutional voids relate to resource constraints through common concerns of distribution and how product or service is designed and serviced (arrow B). Resource constraints as faced by the innovator or firm relate downstream to how the needs of affordability constrained consumers are met (arrow C). In a circular fashion, the affordability constraint links back to the first constraint of soft institutional voids (arrow D). The development of capabilities economically, environmentally, or through learning is contingent on boundary issues of context, culture, and globalization or localization. These linkages provided a basis for modelling these features by using three intersecting circles. The cross thematic and circular linkages suggests the formulation of the model of innovation (2) under constraints as depicted in figure 5.2.

Based on the previous section 5.4, figure 5.2 shows the theoretical model depicting the three theoretical dimensions – institutional innovation, technology innovation, and social innovation – and how they coincide with institutional voids, resource constraints, and affordability constraints, respectively. It is clear again, as it was in chapter 4, that social entrepreneurs in this study agree to disagree that they are purely social innovators. The question again arises, "what innovation is it that they coalesce around?" In figure 5.2 I label the interstices where innovations overlap with question marks to depict this unknown. I next discuss how the concept of frugal innovation can help to fill this void. The portrayal of frugal innovation suggests there are efforts to delineate this blend of existing innovation approaches into a new field of professional and scholarly activity.

<See figure 5.2, page 211>

5.6 Discussion

This chapter showed that social entrepreneurs' conception of innovation embodies using a combination of existing innovations under constraints as depicted in figure 5.3. The third level theoretical dimensions are based on existing literature and represent technology innovation (Schumpeter 1934), social innovation (Mulgan et al 2007), and institutional innovation (Hargrave and Van de Ven 2006).Technology innovation helps us to understand how to address resource constraints, institutional innovation helps us to understand how to address institutional voids, and social innovation reveals the ways by which to deal with affordability constraints.

Literature tells us that technology innovation is about innovating the tools we may use to achieve our goals; social innovation is a novel solution to a social problem for which the value created accrues primarily to society as a whole rather than to private individuals; and institutional innovation is about innovating who we are and why we are doing what we do. However, the three innovations taken separately cannot deal in solo with the simultaneous challenges of innovating under resource scarcity and institutional voids. The model revealed in the preceding chapter 4 and this one both show that social entrepreneurs work beyond the prevailing notion of social innovation. The literature review in chapter 2 suggested in play a combination of constraints. And the myriad ways in which multiple constraints are taken into consideration or addressed came out in the empirical data, of which some quotes were revealed in the earlier section 5.4 above. The following quotes further support the hybridization conceptualized in the proposed model:

"We also need to learn how to systematize better the methodology used so that it can be replicated. To finally systematize the prototype of the radio telecenter model based on an integrated approach to sustainability in the long run, looking into economic, technological and social and their interfaces." (2007s59)

"The Fundacion Paraguaya's mission to pursue sustainable development through the promotion of entrepreneurship is founded on the belief that economic, social, and environmental issues are intrinsically inter-related, and can and should be tackled simultaneously." (2005s152)

The following two quotes exemplify the bridging of social innovation (through learning and economic sustainability), technology innovation (through concerns for servicing), and institutional innovation (through distribution):

"In order to expand efficiently, we employ a 'hub and spoke' model as a means of sales and distribution. The REC acts as the 'hub' from which the 'spokes' are used to distribute our products and services and expand our reach. The spokes consist of: direct retail sales, rural entrepreneurs, other NGOs, banks, and other local organizations such as community groups or farmers clubs. We train rural entrepreneurs to act as distributors and agents who branch out to the smaller local villages conducting promotions and sales. They become knowledgeable of our product range as well as technically proficient so that they can respond to clients' service and repair calls. This approach is innovative and mutually beneficial as it allows us keeps our overhead and payroll down, while providing direct jobs to locals who are able to earn their own income and commissions." (2011s28)

Social entrepreneurs use a combination or hybridization of existing innovations. One way this recombination can be identified, labelled, or conceptualized through the emergent concepts posed by some of the social entrepreneurs, is by the introduction into the model of the quoted concept of frugal innovation. In chapter 6, I analyse the intersections among the three existing innovation streams as fertile spaces where frugal innovation can be understood

to occur. I now discuss what might explain the emergence of social entrepreneurship as a professional field as well as frugal innovation as another potential field.

The conceptual approach in *The Systems of Profession* by Abbott (1988) is based on the division of labor where he argues that defining and laying claim to abstract knowledge is the main criterion for a profession. Abbott defines a profession as "exclusive occupational groups applying somewhat abstract knowledge to particular cases" (1988, p.8). Hence, he argues that professions possess a body of abstract knowledge on which jurisdictional claims are made against competition for the exclusive right to control specific work activities:

> "*For abstraction is the quality that sets inter-professional competition apart from competition among occupations in general. Any occupation can obtain licensure (e.g., beauticians) or develop ethics code (e.g., real estate). But only a knowledge system governed by abstractions can redefine its problems and tasks, defend them from interlopers, and seize new problems--as medicine has recently seized alcoholism, mental illness, hyperactivity in children, obesity, and numerous other things. Abstraction enables survival in the competitive system of professions*" (1988, p. 8-9).

To understand the development of professions, according to Abbott, we need to focus on the educational systems through which individuals become professionals by acquiring this knowledge and are then licensed by professional association to proclaim its use. In setting the jurisdiction, Abbott shows how organizations use lobbying campaigns and public relations campaigns to retain certain skilled performances exclusively for their members. They then certify their members as professionals who are qualified to enact these skills.

The GSBI programme is not a licensing programme, but is an educational system through which social entrepreneurs' gain and share expert knowledge. Through programmes like this one, according to Abbott, some professionals may be trying to build categories of

abstract knowledge around emerging concepts in social entrepreneurship and frugal innovation. However, Abbott recognizes that the abstract knowledge on which professions base their claim to professional status may be only tenuously related to the actual work activities of its members (Tolbert 1990). As outlined in the literature review chapter 2, although social innovation is often ascribed as a 'work activity' to social entrepreneurs, my research shows that social entrepreneurs perceive themselves as ascribing to several other innovation work activities. This supports Abbott's recognition that jurisdictional claims based on abstract knowledge may not necessarily be reflected in the actual work activities enacted by its members.

Further, in contrast to the common assumption of internal homogeneity within professions, Abbott's approach is to focus on the differentiation within professions as a source of occupational change over time (Tolbert 1990). If one were to consider social entrepreneurship as a profession, the findings suggest that within this profession there is differentiation in the approach to abstract knowledge around an inherent activity associated with social entrepreneurs -- innovation broadly but specifically on social innovation. This helps to explain the findings that within the profession of social entrepreneurship, there exists heterogeneity with respect to knowledge of innovation activities. Extending this further, it may also explain why social entrepreneurship hasn't achieved the jurisdictional professional status many in the domain hope for it to achieve given the evolutionary changes occurring within itself. Consequently the boundaries are not so clearly demarcated for it to be considered a professional occupation, in the way Abbott describes a profession.

To support these explanations, I find that the actual adherents or adopters of abstract knowledge of innovation among social entrepreneurs are mobile and fluid across existing

categories. So the claim to social entrepreneurship or social innovation as independent categories in the literature doesn't seem to hold much significance. My findings also suggest that the extent of division of labor across innovation practices is diminishing among social entrepreneurs. In actuality, they attempt to transcend existing boundaries of division of labor in innovation as understood by the scholarly focus on technology innovation (outlined in literature review chapter 2) and move into concerns for social and even institutional innovation. Social entrepreneurs see innovation as drawing from varied motivations and requiring varying knowledge. And any jurisdictional claim to a specific knowledge area of innovation among the collective social entrepreneurs seems not to be of substantial consequence.

From Abbott we learn that professions such as medicine and academia are not concretely defined structures or entities. Rather professions are abstract social things which are fluid, plastic, heterogeneous, with shifting activities (Little 2008). The field of social entrepreneurship is one such abstract entity which is involved in constant change with insufficient identity for personnel, standards, curricula, bodies of knowledge and expertise, and zones of jurisdiction. The challenge for proponents of the new concept of frugal innovation much like the challenge has always existed for social entrepreneurship, as Abbott highlights, is to provide some definition to an entity which is in flux. I shall attempt, in a modest but hopefully convincing manner, to provide this definition of frugal innovation in chapter 6.

5.7 Summary

Recall the objective of the research was to reveal models of innovation under constraints as perceived by social entrepreneurs. The arising model proffered here based on

the data provides valuable insights into how social entrepreneurs view innovation under constraints and seek to deal with these constraints using existing innovation components – overlapping concerns for *social innovation, technology and institutional innovations*. An attempt at conceptualization of model of innovation under constraints supported by data, analysis, and interpretive findings is presented in model 2 (fig 5.2). The mixed use of existing innovation approaches suggests we may use the emerging concept of frugal innovation to identify this hybrid approach to innovation.

In the next chapter I integrate findings and lessons from chapter 4 and 5 to suggest theory development for frugal innovation as a potential field worthy of independent investigation within innovation studies.

Figure 5.1: Coding sequence

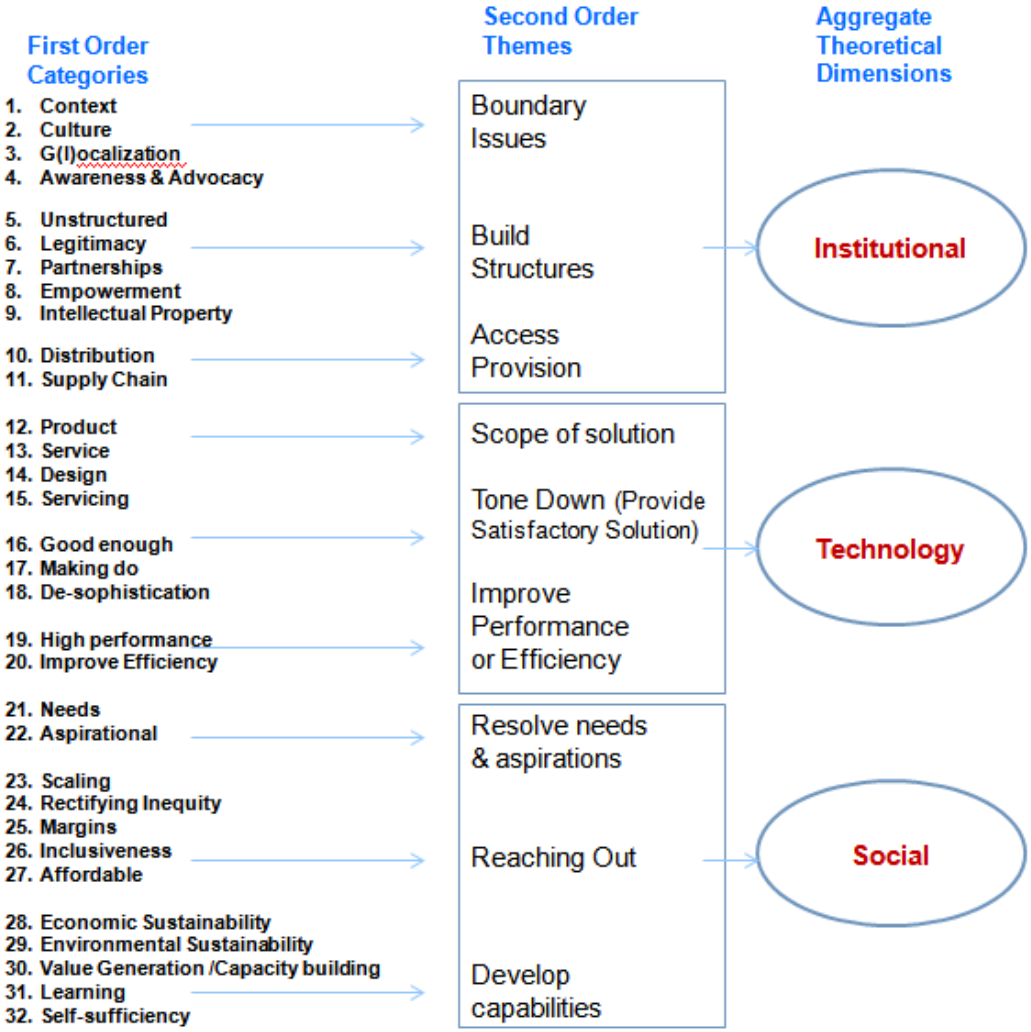


Figure 5.2: Model 2 -- Theoretical dimensions and overlap of resource constraints-institutional voids-affordability constraints

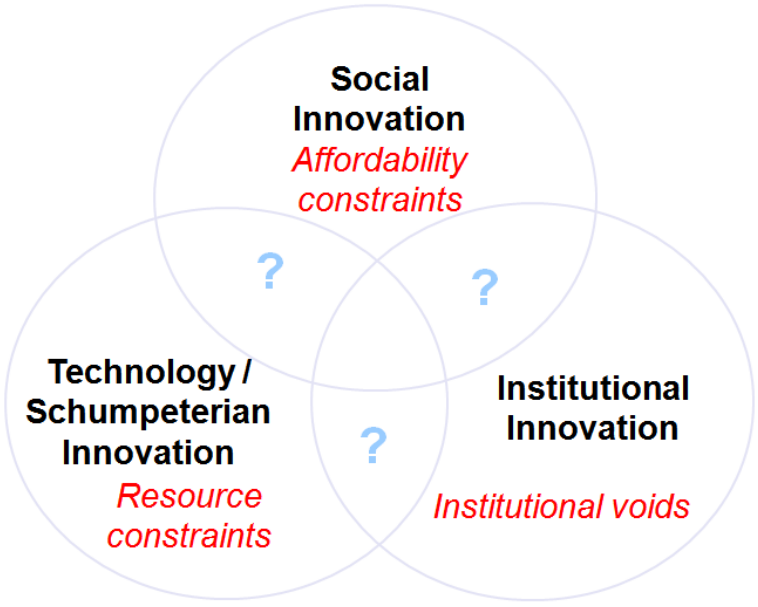


Table 5.1: Stages of analysis for question 2 and 3

Stages	Tasks	Outcomes
Pre-step: Descriptions by interview questions done in previous analysis		See table 4.2 previous chapter: Sample responses to questions posed
1. Identify descriptions on a. institutional voids and then on b.resource scarcity	1. Emphasize text that corresponds to a.institutional voids and then b.Resource scarcity 2. Comparison across data sources 3. Comparison across types of respondents	Table 5.3a: Archival document data sample responses on institutional voids (Bold and underlined) - 296 passages Table 5.3b: Interview data sample responses on institutional voids (Bold and underlined) - 123 passages Table 5.4a: Archival document data sample responses on resource constraints (Bold and Italicized) - 398 passages Table 5.4b: Interview data sample responses on resource constraints (Bold and Italicized) - 131 passages Table 5.5a: Archival document data responses on BOTH institutional voids (Bold and underlined) and resource constraints (Bold and Italicized) - 50 passages Table 5.5b: Interview data responses on BOTH institutional voids (Bold and underlined) and resource constraints (Bold and Italicized) - 41 passages Table 5.6a: Number of passages coded from each data source Table 5.6b: Comparison of types of respondents across inst voids and resource scarcity Table 5.6c: Number of passages that support third level theoretical dimensions
2. Categorize Information to generate main constructs on a.institutional voids and then on b. resource scarcity	4. Recode to generate constructs as first order codes 5. Identify key descriptions as exemplary to the clusters	11 constructs for institutional voids: *Unstructured; Partnerships ; Legitimacy ; Empowerment ; Intellectual property; Context ; Culture; G(l)ocalization; Awareness and advocacy; Distribution ; Supply Chain* 21 constructs for resource scarcity: *Service ; Product ; Design; Servicing; Good enough ; Making do ; De-sophistication ; High performance ; Improve Efficiency; Scaling ; Rectifying Inequity ; Margins ; Inclusiveness ; Affordable ; Economic Sustainability ; Environmental Sustainability; Value Generation/capacity building ; Learning ; Self-sufficiency; Aspirational ; Needs*
3. Identify patterns and connections	6. Integrate first order constructs into second order themes	Figure 5.2: Coding Sequence Three second order themes identified for institutional voids: *Build Structures; Boundary Issues; Access Provision* Six second order themes identified for resource scarcity: *Scope of solution; Tone down; Improve performance or efficiency; Reaching out; Develop capabilities; Resolve needs and meet aspirations*

		Table 5.7: Summary intermediate table showing constructs & themes addressing Institutional Voids & Resource Scarcity Table 5.8a: Archival document data supporting theoretical dimension of institutional innovation – 293 passages Table 5.8b: Interview data supporting theoretical dimension of institutional innovation – 188 passages Table 5.9a: Archival document data supporting theoretical dimension of technology innovation – 182 passages Table 5.9b: Interview data supporting theoretical dimension of technology innovation – 109 passages Table 5.10a: Archival document data supporting theoretical dimension of social innovation – 289 passages Table 5.10b: Interview data supporting theoretical dimension of social innovation – 144 passages
4. Aggregate theoretical dimensions on a. Institutional voids and then on b. Resource scarcity	7. Label dimensions based on emergent concepts or on existing ones found in the literature	Three dimensions for aggregating above themes into: *Institutional innovation,* *Technology innovation and* *Social innovation* Figure 5.3: Theoretical dimensions and overlap of resource constraints-institutional voids-affordability constraints

Table 5.2: First order codes for questions 2 and 3

Questions	*Texts and interviews were coded into*	
How do they perceive and deal with innovation under institutional voids?	1. Unstructured 2. Partnerships 3. Legitimacy 4. Empowerment 5. Intellectual Property	6. Context 7. Culture 8. G(l)ocalization 9. Awareness and Advocacy 10. Distribution 11. Supply Chain
How do they perceive and deal with innovation under resource scarcity?	12. Service 13. Product 14. Design 15. Servicing 16. Good enough 17. Making do 18. De-sophistication 19. High performance 20. Improve Efficiency 21. Scaling	22. Rectifying Inequity 23. Margins 24. Inclusiveness 25. Affordable 26. Economic Sustainability 27. Environmental Sustainability 28. Value Generation/Capacity building 29. Learning 30. Self-sufficiency 31. Aspirational 32. Needs

Table 5.3a: Archival document data sample responses on institutional voids (bold and underlined) - 296 passages

163 Entrepreneurs			
The technology can be patented. As it is hand operated simple device, it comes under village/cottage industry sector. **In India, there is no specific licensing policy as it comes under mini sector**. 2005s145 Our key innovations and offerings include: The Global Social Investment Exchange Platform **emulates the environment of a stock exchange to connect non profit organisations needing funds for specific development and poverty alleviation projects with corporate donors, trusts, foundations and the general public who want to support social upliftment and development in South Africa.** This type of exchange is all about generating social return (**versus the financial returns model of a conventional exchange**). 2007s76 HRIC's E-Activism project works with activists and civil society groups; ethnic minorities; urban workers; migrants; lawyers; and scholars in China, **facilitating inclusive and diverse access to transformative bilingual electronic human rights tools**. 2006s121	This is considered as an innovative technology because, **despite having legal obligation, almost none of the factories in Bangladesh were providing child care facilities**, which were thought to be an additional financial and administrative burden for the employers. In this backdrop, Phulki came up with the idea of setting up crèches in the garments factories with participation from different stakeholders so that it is not a burden on one. Phulki is demonstrating to all stakeholders that there are many benefits of such initiatives - both economic and social. 2005s161 From this starting point, an effective ICT strategy has taken a knowledge brokering approach: identifying who needs information, who can supply the information, what formatting and delivery mechanism will allow the knowledge provider and consumer to communicate and share information, and **what institutional / market structure will provide the appropriate incentives** for such sharing to take place. 2011s15 De-motivation through **debilitating bureaucracy**. 2011s13	In Russia, for example, wheelchair users are confronted by a well-developed, **nearly uniformly inaccessible architectural infrastructure** characterized by tiny elevators, small bathrooms and kitchens, and narrow doorways. Whirlwind's solution was to design a folding wheelchair frame that the rider could narrow him or herself (or with the help of an assistant) while sitting in the chair by pulling a lever underneath the seat and between the legs. The basic idea of folding a wheelchair without the seat rising up (essentially a double parallelogram) was not new. Whirlwind's contribution was to make it so that the rider could narrow the chair while still sitting in it. The manufacturer refined whirlwind's prototype so it could be built using the factory's 1960's vintage machinery. The chair has been built in Siberia since 1994 and users prefer it to all other wheelchairs for daily use because it provides the greatest indoor and outdoor maneuverability of any model on the market. 2006s140	The innovation that we propose is to work strictly with the local elected members in mind of the decentralization and of the good governance. **We count to put a particular accent on the social dialogue between the organized groups and the local governments for the respect for human rights and correct application of the rules of good management** this to participate in the visibility of a strategy of durable right and in the good management of the activities contributing to the well-being of the families. 2007s52 Major obstacle: Economic situation for our main donors, **corruption of African governments that impede investment into agriculture, continued lack of investment in Africa into infrastructure to reduce cost, especially of energy**. 2011s35 We are of the firm belief that our market orientation is an open one and our intervention is one of the most efficient ways to **create ready-market** for rice produce in Ghana and in the West African Sub-region. 2011s34

Table 5.3b: Interview data sample responses on institutional voids (bold and underlined) - 123 passages

Entrepreneur 23 X E	Investor 22 X I	GSBI 39 X F	Mentor 39 X M
This **challenges us to reshape the ecosystem where finance, culture, behavior, and values all matter.** So **successful distribution is and will be the real source of my frugality**. (56E) We are **focused on advocacy and training to raise awareness of taboo issues** (women sanitary pads). Once the awareness is created, individuals naturally seek out sanitary pads. We cannot even donate pads **in an environment where they aren't culturally or socially accepted.** (11E) Our business model **would not have existed 5 years ago** because i) **people were not talking about this opportunity, ii) rural broadband was not available, and iii) water and health technologies were not ready.** (7E) **The distribution network of FMCG in West doesn't work in developing markets. In the former people come to the stores and in the latter we need to do as reach consumers as do the Solar Sisters.** (56E) **Partnerships are however very useful with NGOs in creating awareness and to develop distribution network in remote areas where NGOs often have access to.** (22E)	Small businesses **face a 'missing middle' for both debt and equity financing**. If you need less than $100K you get it from family and friends and if you need more than $2M then you are VC investable. So new impact investment networks such as our TONIC **comprised of angels tries to fill this missing middle**. (10I) A raging debate among impact investors **is the question of financial first (IRR) or impact first (mission)?** (10I) So the BOP wasn't taken seriously by mainstream VCs. **Either the entrepreneurs there will have to find local investors or the VCs in Silicon Valley will change their strategies**. The latter could happen if the VCs realize the benefit of developing products for developing market large populations. **But overall it is hard to convince** traditional non impact VCs to invest in developing markets based on technology and financial impact. (27I) Most of the business models at the GSBI programme **fall apart at the point of last mile distribution**. (27I) The lesson is that imported **solutions which do not take into account contexts only worsens the consequences**. (11E)	It becomes ***quite expensive to innovate for the BOP*** **because of rural access, cultural interpretation, and language.** E.g. tribal leaders have to give authorization for **access to village people**. In contrast, in the developed countries one **can quickly contract out a market survey or focus group research** to get quick product feedback. (20F) The user needs in developing markets are very different from those in Western nations, so we must place utmost relevance on defining user needs. Even the **platforms, to use computer engineering language, would be different or none exist.** (40F) The flying villagers as in Peru are an example of Jugaad. **That kind of practice would never be allowed here in USA**. (20F) It isn't that easy to do perhaps because the **solutions are not suited or amicable to where the problems are**. (34F) We see that social entrepreneurs **have two broad problems**, one coming up with a product or product based service and two **distribution or supply chain** management. This is why we decided to give students a choice of the two parallel modules: FI or Supply Chain management. (53F)	For instance **Airbnb works in USA but not in India because of lack of building trust and checking authenticity of home assets advertised**. Instead the analogous issue there is bringing online rooms from guesthouses. (17M) Even in the US we have microfranchises like hot dog and ice cream carts. **But while microfranchisees here can go to a central distribution store like Costco to get supplies or even have them delivered, this is not so easy in developing countries**. (32M) MNCs can't just look at 20% ROI as a criteria of a social enterprises' value creation. **The distribution network these ventures create is often more valuable than the products or services they deliver.** Consider the value to Coca Cola is more in the distribution network rather than the Coke product. The next strategy for MNCs should be to acquire social enterprises. (2M) Most term sheets from VCs to our type of impact businesses **will make even the VCs brush on how harsh** they are on the social enterprises. (2M) If the poor are not in control of getting themselves out of poverty, then you **have to help find intermediaries who use social capital** like money or resources. (26M)

Table 5.4a: <u>Archival document</u> data sample responses on resource constraints (bold and italicized) - 398 passages

163 Entrepreneurs			
Health care demands in Africa are increasing, while the ***resources to meet them remain inadequate***, and yet many of these diseases are preventable. 2007s53 IDEI's drip irrigation systems allow smallholder farmers to efficiently and productively use the ***limited water resources available*** to them and to increase their productivity, yield and subsequently incomes by an average of USD100-1000 per family. IDEI is primarily engaged in the promotion of ***affordable***, energy efficient, micro-irrigation technologies, particularly ***low-cost*** drip irrigation. IDEI also introduced the use of micro-tube in place of emitters or drippers; these micro-tubes have several other benefits other than the cost like efficiency and easy maintenance and replacement. 2006s125 Similarly the performance of Banks in terms of rural and micro credit in India is far from satisfactory, NBJK can easily widen its base through partner NGOs and ***provide timely and need based credit to the small and medium farmers*** and women for income generation. 2007s85	Solar concentrators are commonly used in developing world countries, but no one has combined them with ubiquitous car engine parts to create ***affordable*** electricity and refrigeration in addition to heat.Imagine if you could take components from a car engine (pumps, alternator, turbocharger) and recombine them in a new way to create a simple turbine. Add to it a source of free fuel, the sun, and you get a clean, sustainable and ***inexpensive energy source*** which could generate hot water, electricity and refrigeration for community centers, clinics, schools and small businesses in poverty stricken areas where there's ***limited access to energy sources***, but plenty of access to the sun. 2007s95 ***Little funds can be used for the purchase of the initial materials*** including improved variety of the oil palm seedlings and fruit tree seedlings. Local funders can also help the schools acquire the materials. ***Alternative local products can also be used e.g. clay pots with cover for water security units and empty cartons for waste baskets***. Baskets can be produced, painted and designed for sale to generate fund by the schools. 2007s72	Many developed countries are suffering now from an exodus of nurses and clinical officers who are finding employment ***in developed countries where shortages exist, further exacerbating an already serious problem***. Our franchise system provides the needed business infrastructure that health workers need to confidently provide services to their communities, ***saving themselves the costs of re-location in other parts of the country***. They find fulfillment in providing essential services whilst earning a good living wage. Bamboo charcoal utilizes an untapped ***renewable resource*** that can challenge the status quo through its ***affordability, efficiency***, and cleaner burning qualities. 2011s36 Obstacle: ***Scarcity of supply of rice husks*** for rural use especially when large-scale industry heavily utilized rice husks for other purposes such as cement factories, brick making, etc. 2011s14	Business model: Its focus is one strengthening rural communities and reducing alienation in cities. Establishes capacity and ***resources in disadvantaged locations where ability to develop these is otherwise not possible both due to material and training shortfalls***. Creating an oasis in a ***desert of resources***. 2007s93 Use of ***construction capital, equipment and personnel is thus reduced***. Main impacts are jobs, ***affordable*** housing, i***ncreased farm income***, and ***foreign currency deposits as foreign exports*** begin. Spin-off effects on local economies. Imports of building materials will be unnecessary. 2006s106 The introduction of hand drilled wells in Niger has benefited over 1500 farmers and villages providing access to water at an ***affordable cost in a country where water is absolutely crucial and surface sources are rare***. 2007s66 Obstacle: ***Lack of sufficient funds and adequate equipment***. 2011s19

Table 5.4b: Interview data sample responses on resource constraints (bold and italicized) - 131 passages

Entrepreneur 53 X E	Investor 12 X I	GSBI 36 X F	Mentor 10 X M
Another lesson is that ***small inputs make huge differences in rural poor communities***. In one case I helped raise $42 for the family to improve their washing and latrine unit. The ***family was resourceful to the extent they did all the installation and maintained it regularly***. In another instance I provided 20% of down payment for a Japanese weedwacker device called Shianto. Three years later this device helped the ***family increase income generation and the family did all the kinds of financial and technological improvisations*** to assure the device was sustained and maintained. They initiated ***advance service agreements*** and ***used spare parts not orginally designed for i***t. (23E) The poor we serve are more interested in learning ***about how to make more money rather than on saving money***. (25E) A solar lantern takes 5-9 months to pay back but ***lasts 5 years and yet still people don't buy it***. We are trying to ***replace an OPEX high solution kerosene with a CAPEX high solution.*** (56E) The Aravind model which we look to emulate is a frugal innovation because **it shows and proves** ***that you can deliver high quality at low costs***. But because Salauno has ***fewer contextual resources to rely upon***, such as availability of nurses and doctors, we have to strive to be even more efficient than Aravind. (44E)	However even impact investors have a difficult time investing in developing market low sophistication and ***low cost innovations***. (10I) A horizontal market approach ***dilutes resources and defocuses product development***. My suggestion is to focus on a vertical strategy as it ***helps to focus resource allocation decisions*** which we followed. (27I) I understand frugal innovation from Radha's perspective on ***low cost***, rugged, user friendly, and simple. As an engineer ***I recognize these are very challenging design criteria***. (27I) Originally D.Light wanted to serve rural poor customers. But they ***incurred substantial RnD expenses*** and therefore chose to first target relatively affluent segments (at $50/light) in India who experience intermittent power. In the process they blew it and others entered the BOP lighting market. (9I) I use a hybrid model of investing because ***the rate of return in S.E. Enterprises is very low and takes a long time***. So I make up for the delay in financial return through regular investing. (50I)	Originally D.Light wanted to serve rural poor customers. But they ***incurred substantial RnD expenses*** and therefore chose to first target relatively affluent segments (at $50/light) in India who experience intermittent power. In the process they blew it and others entered the BOP lighting market. (9I) Although these lessons are from social enterprise, the lessons could be useful for all firms ***wishing to lower costs***. (12F) Japanese techniques borrowed from J.Demming believe that quality is free, because ***if it weren't then you'd pay for it much more in after sales service and loss***. In the 70s and 80s the Japanese ***showed that low cost and high quality*** were not mutually exclusive. (12F) As a marketing person I think it is understanding needs and ***not just making it cheaper or affordable***. (8F) ***Cost reduction has been about greater profit margins for the company***. But ***now social enterprises are figuring out cost reduction for the end user*** instead. (29F) Sometimes ***cost reduction may not always be great***. It may be good for the enterprise but not for the farmer who serves as a seller. (29F)	Frugal innovation is about ***low cost due to fewer resources*** but more importantly it is about social needs. (24M) We hold a ***mindset of sufficiency. Last year we had a surplus of 13 million from a revenue of 27 million.*** Forbes called this a benchmark for commercial businesses. (33M) ***Cost reduction innovation of existing products doesn't work***. Take the example of OLPC. It ***hasn't achieved its target price*** and it is loosing time to cell phones, the latter being more simple, yet powerful and ubiquitous. Simply reducing cost of existing products won't work. (19M) In India innovation is at the grassroots level as in the case of Jugaad, a term that ***denotes making do with whatever resources are on hand***. One common practice is to ***reuse a water pump engine for another unmeant purpose like a rural van***. Or like the clay fridge. So people are creative, however in an unstructured way. (36M) I told GE that ***10-15% cost reduction as being talked about means they are not serious in addressing the BOP. Instead they need a 10 fold decrease***. (2M)

Table 5.5a: Archival document data responses on BOTH institutional voids (bold and underlined) and resource constraints (bold and italicized) - 50 passages

163 Entrepreneurs			
Raising resources: ***How can IDEI attract investment***, particularly from Social Venture Funds and donors **to support the market based approach for poverty reduction**? Subsidy: How to cope with the massive government subsidies available on large drip systems? 2006s125 BushProof has been started with lots of enthusiasm, but ***insufficient financial resources***. This makes us financially vulnerable and reduces the impact we can achieve. To BushProof, the profit element is vital for ensuring long-term sustainability: making sure basic products remain available even in the ***absence of donor funding***. Yet, this is viewed with varying degrees of **suspicion by those who consider the private sector as fundamentally exploitative**. Regarding investments, the significant humanitarian and public health impact of BushProof's activities ***warrant the use of public funds to finance certain initiatives***. 2006s111 This model would leverage existing entrepreneurs with ***little capital*** to provide massive content and **connectivity infrastructure nationwide**. 2007s90	Even in the developed world, SMS is an effective communications medium for reaching vulnerable groups such as ***low-income families*** and frequent movers, for whom their **mobile phone is their most reliable 'address'.** 2011s44 The technology being used is essentially bicycle technology that is ***inexpensive*** and **readily available throughout the developing world**. On the one hand, Whirlwind's technology is "low tech" in that it does not use aluminum or titanium but relies on mild steel tubing that is easy to braze, or mig weld, technologies that are ***inexpensive*** and **widely available** in developing countries. The production process is also designed so that a small wheelchair-building business can be set up with a ***minimum of tools, equipment, and capital investment***, and the entire process is designed so that a wheelchair user can perform all wheelchair construction activities. Simple jigs and fixtures can also be ***manufactured cheaply*** for use in small shops. On the other hand, the technology is "high tech" in that skilled machinists can manufacture the precise jigs and fixtures needed to produce large volumes of high quality wheelchairs in local shops. 2006s140	The biggest problem facing micro-entrepreneurs and small businesses in developing countries **is the inability to access the larger public market and its market information**. They **simply do not have efficient channels to reach customers.** For example, a single ad in a Chinese newspaper ***costs as much as $250, creating a major obstacle that limits their potential*** and prevents them from escaping poverty and advancing in life. e-Mobilizer solves this problem by leveraging the pervasive cellular infrastructure and mobile technology to connect micro-entrepreneurs and small businesses to the online marketplace, as the world's poorest people are rushing to embrace cell phones because of their convenience and ***low cost.*** e-Mobilizer is an online classified advertisement platform with mobile interfaces, essentially a "Craig's List + SMS." It creates an ***affordable*** online **marketplace accessible by anyone** who has a cell phone. Just ***like micro-finance gives people access to capital***, **e-Mobilizer gives them access to markets**.2005s147	Mission: Promote and protect human rights in China. Technology can play a critical role in ***leveraging limited resources*** and **capacity-building of local change agents**. The project seeks to generate scaleable, replicable sustainable partnerships and tools that support the **development of civil societies** around the world. 2006s121 Australia's Indigenous Stock Exchange (ISX) was formed in May 2003 as a fast track for capital to **directly link with businesses developed by Indigenous** men and women. This proceeded Muhammad Yunus' call for a **social stock exchange**. The view of the Chairman of the ISX, Gerhardt Pearson, is that **to preserve traditional culture it is necessary for Indigenous people to fully participate in the 21st century economy and society**. The ISX's immediate five year goal is to **access private capital investment** for start-up and expanding Indigenous firms through ***loans, grants, equity partnerships and other financial mechanisms***. 2006s123 Challenges: ***Customer Purchasing Power***; **Fossil fuel Generator Importing Cabals; Government Tariffs on Components**. 2011s39

Table 5.5b: Interview data responses on BOTH institutional voids (bold and underlined) and resource constraints (bold and italicized) - 41 passages

Entrepreneur 11 X E	Investor 5 X I	GSBI 17 X F	Mentor 8 X M
I don't agree with handout models like Solvatten ***selling expensive solutions to NGOs*** and doners ***because it isn't sustainable***. At Nazava we believe in the market and **selling directly to the consumer**. (22E) The Aravind model which we look to emulate is a frugal innovation because **it shows and proves** ***that you can deliver high quality at low costs***. But because Salauno has ***fewer contextual resources to rely upon***, such as availability of nurses and doctors, we have to strive to be even more efficient than Aravind. (44E) In fact ***we are considering using older technologies like the voice modems of the 80s*** **to allow our target schools to download data over the radio analog network**. (51E) So good innovators can find markets for their inventions. Truth is, people will buy these ***if designed properly*** and **efficiently distributed.** So **distribution will be the real key source of frugality. I've learned in this programme that I need to help my distributors to have the capacity to distribute**, ***such as with access to financing***. (25E)	At Tonic I founded a network of impact investors ***who benefit from lower transaction costs*** through i)**greater sourcing of leads,** ii) **knowledge availability** for due diligence, iii) **best practice sharing** and iv) syndicated deal closing. For the causes this helps ***increase the velocity of money*** for impact investment. (10I) We have already been laggards in mobile banking because **we have alternative well developed infrastructure here**. But we will need to catch up and start ***designing and developing and investing in developing economies to bring back solutions that could be useful for ourselves***. (27I) There **was a fad when VCs set up** funds in India and China to invest in companies that designed there in India and China ***but for the upper middle populations in those countries and not for the BOP***. They also ***invested there to take advantage of low cost outsourcing of skills and technology to develop solutions*** for home Western markets. (27I) Solar sisters is ***another low cost*** and **simple delivery model of frugal innovation to get products to users**. (10I)	Jugaad or FI cannot work in the USA because **those kind of cars and tractors would not be allowed to run on the roads here**. Plus ***used cars are so affordable*** here that the need for a Tata Nano seems to not exist. (20F) It is ***not just about low price***, but many of the energy firms are **investing in building their image**. (1F) Selco **partners with universities, volunteers and grants** ***to achieve cost reduction in their RnD lab***. (29F) Even the US, with its mass production systems has built the **local ecosystem capacity to achieve long term sustainability and servicing**. (52F) So a key lesson is that you always ***focus on the long term value you create for the client***, not just the product you sell. This will define your business model including pricing and production. **However, it is difficult to say what this means for developing country social enterprises. We need more research in this**. Some cases like e-Choupal show that you can't just take a product centric or service centric view, you have to do both within the value created through your business model. (53F)	***As an engineer bringing 10% cost reduction is difficult with next 10% even more so and the next 10% even worse.*** And **it is particularly hard for designers in West** to accomplish this for developing world ***because of cost reduction impediments*** and **inability to understand fully needs of those communities**. (19M) In the USA if I ask people how much they pay for their water bill, they have no clue. But if I ask them how about their cable bill and they know exactly $102.67! This means we take for granted some of our very basic human rights such as water, and ***we consequently waste it.*** The water ***here costs only 1/2 cents per gallon*** and the quality of tap water is even better than bottled, because **it is so much more heavily regulated**. Yet we pay $1 for a small water bottle. (49M) The **development of GSMA standards** ***helped to lower cost of technology for all to be able to afford***. And mobile is probably the only sector through which MNCs have innovated widely for the BOP. (2M) 100% of the parahealthcare staff is trained inhouse **through a US accredited two year programme** t***hat trains high school rural women***. 90% of our eye doctors are trained inhouse. (33M)

Table 5.6a: Number of passages coded from each data source (baseline)

	Archival Documents (163)	Interviews / Observations (70)	Total	%
Question 2: Institutional voids	296	123	419	40%
Question 3: Resource scarcity	398	131	529	51%
Both resource scarcity and institutional voids	41	50	91	9%
Total	**735**	**304**	**1039**	**100%**

Table 5.6b: Comparison of types of respondents across inst voids and resource scarcity

	E	I	F	M
Institutional Voids	23	22	39	39
Resource Scarcity	53	11	36	31
	+ 241%	**-55%**	**-5%**	**-20%**

Table 5.6c: Number of passages that support third level theoretical dimensions

	Archival Documents (163)	Interviews / Observations (70)	Total	%
Institutional Innovation	293	188	481	40%
Technology Innovation	182	109	291	24%
Social Innovation	289	144	433	36%
Total	**764**	**441**	**1205**	**100%**

Note: This breakdown suggests that since baseline passages are 1039, the dimensions overlap and intersect which supports model 2

Table 5.7: Summary intermediate table showing constructs and themes

Theme: / Context:	Institutional Voids		Resource Scarcity	
	Soft	Hard	Constraints	Affordability
Boundary Issues	Context Culture G(l)ocalization Awareness & Advocacy			
Build Structures	Unstructured Legitimacy Partnerships Empowerment Intellectual Prp	A		
Access Provision		Distribution Supply Chain		
Scope of solution		B	Product Service Design Servicing	
Tone Down (Provide Satisfactory Solution)			Good enough Making do De-sophistication	
Improve Performance or efficiency			High performance Improve Efficiency	C
Resolve needs & aspirations				Needs Aspirational
Reaching Out				Scaling Rectifying Inequity Margins Inclusiveness Affordable
Develop capabilities				Economic Sustainability Environmental Sustainability Value Generation /Capacity building Learning Self-sufficiency
Theoretical dimension:	**Institutional Innovation**		**Technology Innovation**	**Social Innovation**

D

Note: A, B, C, D indicate overlap of concerns which effect next theme(s)

Table 5.8a: <u>Archival document</u> data supporting theoretical dimension of institutional innovation – 293 passages

Build Structures	**(Un)structured** • Besides financing, the biggest obstacle to future growth is organizing and putting a plan and structure in place that can effectively meet growing demand. 2011S5 • De-motivation through debilitating bureaucracy. 2011s13 • From this starting point, an effective ICT strategy has taken a knowledge brokering approach: identifying who needs information, who can supply the information, what formatting and delivery mechanism will allow the knowledge provider and consumer to communicate and share information, and what institutional / market structure will provide the appropriate incentives for such sharing to take place. 2011s15
	Partnerships • It is also a participatory approach to establish crop insurance through a process of community driven management with participation of different on-farm & off-farm agri-stakeholders to ensure qualitative and quantitative input supply, technology & marketing security and finally an institutional process will be emerged for scaling up grassroots entrepreneurs adopting ICT. 2011s15 • By involving the women as active participants in the distribution, they not only have the opportunity to earn much needed income, but they become strong advocates of the products, selling to their natural networks of family, friends and neighbors. 2011s17
	Legitimacy • Re-branding the image of a maids' job, to allow maids to continue doing the same work, but improve their perception of their job, promote the feeling of dignity and help them reap their benefits appropriately.2011S9 • Getting more participants convinced about the income potential of growing Moringa. 2011s12 • These technologies – like the hand-driven oil-expellers, bio-gas plants, smokeless stoves – have been evolving for decades, but have not received much attention from larger political movements. 2011s19
	Empowerment • To empower the disabled & economy freedom/participation in International platform. 2007s75 • By paying even a token sum of Rs 10 ($ 0.16), the child not only feels compelled to continue his studies but also feels honored to be a paying member of the school. 2007s98
	Intellectual Property • Our fair trade and development objectives are very important to us and any licensing or copyright issues would be looked at in the light of how they would benefit the artisans involved. 2005s148 • We value free access to intellectual property and general public licensing. We have distributed our software and other resources freely via Internet. Of course, this depends on specific client requirements. 2005s141
Boundary Issues	**Context** • Padma have faced challenges at different level of the intervention. First of all, when communicating with local farmers, then its found that they use some local terms (not pure Bengali) for their farming and the farmers of different villages use different local terms. It was very hard then to capture those local terms and convert into English to communicate with international researchers and again re-deliver the feedback to the farmers in their local terms. 2011s15 • In most cases, however, it is less that the technology or even the basic idea itself is new than that the technology is applied creatively to a wide variety of environmental conditions. 2006s140

	Culture • Instead of advocating a new technology or material, Build Change makes low or no-cost modifications to existing, common, culturally appropriate and preferred ways of building to create long-term change and reduce deaths, injuries and economic losses during earthquakes. 2007s58 • We assume that a change in culture won't happen until the society has the opportunity to go through a learning process, having live experiences with disabled people. From these ideas, Unidos takes its mission. 2005s162
	G(l)ocalization • This project facilitate communication from global to the local and back to the global level via intermediary knowledge brokers. 2011s15 • An important part of the program is local manufacture to keep the cost of the equipment as low as possible. It will be easy to establish local manufacture because no high tech fabrication techniques are required. Thus replication to other countries and regions is very possible. 2006s133
	Awareness & Advocacy • We run regular Moringa awareness sessions for large-membership groups and students of public high schools. We also run regular advertisements on a popular radio station that reaches over 10million listeners. There is therefore a very high level of awareness about the nutritional and other benefits of Moringa, thus creating a huge demand for our products and services. Scaling-up and expansion will therefore be easily facilitated. 2011S12 • Promote a social transformation movement for the integration of the disabled, through a warm and interactive formula with young volunteers, resulting in a more sensitive society, reducing the social fear to disabled people. 2005s162
Access Provision	**Distribution** • Second, there is a problem of access. In the developing world, reading glasses are primarily available in local optical shops in urban centers. The poor who live in rural areas have little-to-no access to these stores. At present, reading glasses are sold exclusively by eye doctors and optical shops at significant margins making them too expensive for the average person. Furthermore, in order to reach these optical shops and doctors, people have to take a day off work and travel great distances. This effort adds an additional opportunity cost to getting the glasses. To increase accessibility to the reading glasses, innovative distribution channels such as the micro-enterprises, mobile units, and retail shops have been developed to bring the product closer to the consumer. 2006s132 • Our primary distribution is small and highly-targeted, unlike most filmmakers who seek massive but often important audiences through TV or theatrical release. We would rather get our production seen by a dozen decision-makers in a position to make change happen than by a million viewers who aren't. Our productions aim to make change happen, not to document change happening. Our productions are not documentaries. They are not objective. They are advocacy films, a genre that has been dormant since the 1930's. 2007s81
	Supply Chain • Many failed economic development programs create long supply chains resulting in spare parts and repair facilities that are either nonexistent or unavailable where they are needed. 2006s119 • Food security problems. Sometimes food security problems can be addressed by properly matching the supply and demand of goods. Easy access to information on where the commodities are available and where it is needed can provide the safety net for food security problems. 2006s109 • We are currently working on our supply chain. We see scope for improvement in this area. Our supply chain is one that needs to be worked upon. We are flooded with orders that need to be fulfilled. This is taking a little longer than it should. We should be able to solve this issue in a few weeks. 2007s99

Table 5.8b: Interview data supporting theoretical dimension of institutional innovation – 188 passages

Build Structures	**Unstructured** • In relation to the formal processes in 1st world it is difficult to layout the complexities of developing country contexts to investors. Even the processes of business model and business plans are too structured for developing context complexities and uncertainties. (13E) • It becomes quite expensive to innovate for the BOP because of rural access, cultural interpretation, and language. E.g. tribal leaders have to give authorization for access to village people. In contrast, in the developed countries one can quickly contract out a market survey or focus group research to get quick product feedback. (20F) • In India innovation is at the grassroots level as in the case of jugaad, a term that denotes making do with whatever resources are on hand. One common practice is to reuse a water pump engine for another unmeant purpose like a rural van. Or like the clay fridge. So people are creative, however in an unstructured way. (36M) • I think frugal innovation is an attempt to formalize jugaad by instilling a more structured approach and through building partnerships with engineers in the West. (36M)
	Partnerships • Over the years, Engineers w/o Borders and other initiatives have made aware of projects around the world. For instance in Elsavador and Nicaragua we do projects where SCU has Jesuit partnerships. These relationships and partnerships are crucial for our projects' implementation & success. (40F) • It is an effort to engage the rest of the university mainly engineering and the business school. (15F) • Frugal innovation is a nice effort to partner technology with entrepreneurship to come up with novel solutions for social problems that are both chronic and acute problems. (34F) • Selco partners with universities, volunteers and grants to achieve cost reduction in their RnD lab. (29F) • Partnerships are however very useful with NGOs in creating awareness and to develop distribution network in remote areas where NGOs often have access to. (22E) • Because we are a startup we can't afford to invest in time and energy in collaborations with the frugal innovation lab here or others like MIT lab. I'd rather do it myself or with local partners. (51E)
	Legitimacy • We are focused on advocacy and training to raise awareness of taboo issues (women sanitary pads). Once the awareness is created, individuals naturally seek out sanitary pads. We cannot even donate pads in an environment where they aren't culturally or socially accepted. (11E) • Unfortunately as an investor now, I don't see traditional VCs investing in though the applications could enjoy economies of scale. They would just not pass the 'sniff' test. (27I) • Most funds did not care if the segment is rural or urban. But this is changing now given the rural BOP are 3X less wealthy in PPP than urban. There are now reports which warn not to expect to become rich from serving the BOP. (10I) • It is not just about low price, but many of the energy firms are investing in building their image. (1F) • So we went from recognizing ventures through TechAwards, to nourishing them through GSBI, and helping to develop the technologies through Frugal Innovation Lab. So we have three sector strategies, business models (GSBI), technology solutions (frugal innovation lab), and socio-political cultural development (education). (1F) • The frugal innovation component is only in its second year now. Although too early to say but evidence of value add to the programme has been sketchy. (15F)

Boundary Issues	**Context** • Initially we imported pads but found that the pads were clogging toilets and were not biodegrading creating greater health risks. So we came up with a patent pending chemical less process to manufacture biodegradable pads. And the localization manufacture policy in South Africa and India helps to establish local manufacturing capability. (11E) • In silicon valley more sophistication is done because we can do it. However, best or most innovative technology is not the best solution in all contexts. (21F) • Frugal Innovation is about innovating products mainly for social causes. One such project I am working on is an ATM dispenser for medicines that ensures the authenticity of medicines and 24x7 availability. (2M)
	Culture • It isn't that easy to do perhaps because the solutions are not suited or amicable to where the problems are. (34F) • It becomes quite expensive to innovate for the BOP because of rural access, cultural interpretation, and language. E.g. tribal leaders have to give authorization for access to village people. In contrast, in the developed countries one can quickly contract out a market survey or focus group research to get quick product feedback. (20F)
	G(l)ocalization • Initially we imported complete systems at high cost from Brazil to Indonesia. But then we found a supplier in India from whom we import parts at low price and assemble locally in Indonesia using other local parts like taps. (22E) • I learned much from travelling as a grant assessor with the World Bank and saw different tools and techniques all over Africa. (14E) • Emerging markets have several platform technologies available to them from global sources. This privilege was not available to the US a hundred years ago. (43F)
Access Provision	**Distribution** • This challenges us to reshape the ecosystem where finance, culture, behavior, and values all matter. So successful distribution is and will be the real source of my frugality. (56E) • Solar sisters is another low cost and simple delivery model of frugal innovation to get products to users. (10I) • GE's Healthy Imagination Initiative has not succeeded in reaching rural areas -- it has reached middle income towns but not the BOP. (2M)
	Supply Chain • We were both design and RnD and production focused but now we have the money and proved the design, we are rethinking the rest of the value chain. (25E) • To me frugal innovation is the IDE and Paul Pollock's of this world who seek to cut out a lot of the steps in the supply chain by using local content, materials, and local labor. (25E)

Table 5.9a: Archival document data supporting theoretical dimension of technology innovation – 182 passages

Tone Down (Provide Satisfactory Solution)	**Good enough** • Operational Mind Kiva was able to go from a concept to a well-known reality in a short period because of an ability to translate ideas into action. We take a very pragmatic approach to every problem and like to see progress made every day. We emphasize daily execution over more esoteric approaches. Lately, I have heard from many people who have had a similar idea but were never able to get it off the ground. Kiva was able to start because we chose a small village in Africa and we made a small website in America. Now, both the village and the website have been elevated to a higher level thanks to a "just start" mentality. 2006s128
	Making do • The weavers we work with still use traditional materials and tools for production: traditional weaving looms and spinning equipment. However, they have significantly developed their know-how on natural dyes. It is also a means to publish their research. They obtained different colors through experiments carried out with locally-found materials. They use nearly 20 plants to produce the colors; in other words we are developing organic products. Participating in research on plants used for dyes in Madagascar is a means to publicize and share the female weavers' knowledge on the subject. 2006s130 • Whirlwind is currently collaborating with the HandiNor wheelchair factory of Norway in the design and production of just such high quality jigs and fixtures to be used by wheelchair shops in developing countries. These jigs and fixtures will be provided at little or no cost to the shops. Many of Whirlwind's design ideas are creative applications of technology used in other contexts. For example, on a visit to Zimbabwe, Whirlwind's chief engineer, Ralf Hotchkiss, saw a molded wide rubber tire on a pushcart. Hotchkiss first redesigned the tire so it could be used on a wheelchair caster and then figured out how to make the entire wheel out of molded rubber. The result is an inexpensive, solid rubber, puncture proof wheel with a footprint that is 30 to 50mm wider than the casters on most commercially available wheelchairs. The wider footprint gives the wheel greater flotation and therefore much improved performance and reliability in snow, sand, mud, and over generally rough, unpaved terrain. These wheels can be locally produced for less than $2 each. In most cases, however, it is less that the technology or even the basic idea itself is new than that the technology is applied creatively to a wide variety of environmental conditions. 2006s140
	De-sophistication • Floating Water Closets is very simple in making, using, and keeping. FWCs use the cheap/efficient materials and abundance. It makes from woods, PVCs, and drum. The drum that we are using is made from trace goods. In processing feces, FWCs use carbon active and it can be taken from coconut shell. And also the waste processing media such as palm fiber, sand and gravel are very abundance material in this area. Therefore, the maintenance this materials is very easy. The using of the FWCs as same as public WCs, so that is not so long adapt to use it. 2007s78
Scope of Solution	**Product** • The high improved stove design is becoming very popular throughout the country and internationally, as a result it is becoming excellent example inspiring young generation to invent new ideas that change our world in tangible manner including me I have invented again an energy saving device operating in LPG.This and other outcome will benefit humanity. 2011s42 • Pilot project of windmill installation is cost effective, environment friendly, appropriate technology and sustainable/with less research and management initiative for NGOs/donors and Govt. 2007s49
	Service • The innovation is in practical use of modern ICTs to provide appropriate information in rural and urban poor communities. This is combined with partnering with communities and Partner Agencies to work through existing structures, and maintaining a two way communication system to ensure information provided remains relevant. We facilitate putting the information provided into action for real benefit. Audiovisual technology is used for developing local

	content, in local languages, and disseminating to overcome low literacy levels. 2007s53
	Design • In Russia, for example, wheelchair users are confronted by a well-developed, nearly uniformly inaccessible architectural infrastructure characterized by tiny elevators, small bathrooms and kitchens, and narrow doorways. Whirlwind's solution was to design a folding wheelchair frame that the rider could narrow him or herself (or with the help of an assistant) while sitting in the chair by pulling a lever underneath the seat and between the legs. The basic idea of folding a wheelchair without the seat rising up (essentially a double parallelogram) was not new. Whirlwind's contribution was to make it so that the rider could narrow the chair while still sitting in it. The manufacturer refined whirlwind's prototype so it could be built using the factory's 1960's vintage machinery. The chair has been built in Siberia since 1994 and users prefer it to all other wheelchairs for daily use because it provides the greatest indoor and outdoor maneuverability of any model on the market. 2006s140
	Servicing • By developing our brand and reputation for providing pre and post-sale customer service and products that improve quality of life, we hope this will assist us to expand in the largely volatile and risk-averse markets of Kawangware and beyond. 2011s25 • Robust, simple and appropriate, they can be easily maintained at village level and repaired using locally available materials and skills. 2006s111
Improve Performance or Efficiency	**High Performance** • (Our) Initiative introduces a new concept in water manufacturing based on Artisan in Mineral Water. This is a HUGE step to make difference with the water industry proposing product conformity and standardization. 2011s21 • Create a brand which will be nationally recognized for its high quality, fair prices and excellent service. - Ability to compete with the technology of imported products. 2011s32
	Efficiency • Communities for setting up new RECs are chosen where there is an established NGO or MFI, which is efficient and economical. 2011s28 • We are researching management information (MI) systems to improve efficiency by created a streamlined data collection process that is easy to use and aggregates data. 2011s23

Table 5.9b: Interview data supporting theoretical dimension of technology innovation – 109 passages

Tone Down (Provide Satisfactory Solution)	**Good enough** • Even if the solution is 80% right, but with 100% focus and with team fully on board, you can succeed. (27I) • What we (at Intel) learned from impending competition from OLPC was to redesign the processor for low cost net-books with good enough performance. So yes the West can learn from technology application in developing countries. (4E) • Most of the entrepreneurs here aren't looking to redesign but to use existing suboptimal technologies. When they achieve some success perhaps then they will look to formally and frugally innovate. (37F) • I am not sure what frugal innovation means, may be to partner with university based engineers to solve technology problems. So we would like the frugal lab to come up with a very simple phone and app that minimally does nothing else but query information from the farmers. We will pay for the phone and data connection, so wouldn't want the phone to be used otherwise. (45E)
	Making do • We do jugaad to the extent of making do with what we have, but not to the extent that we let jugaad hold us back on quality delivery. (33M) • All tools are sourced locally, even the ultraviolet and 'pressure cooker' steam disinfectant which have other uses in the region. (14E) • In fact we are considering using older technologies like the voice modems of the 80s to allow our target schools to download data over the radio analog network. (51E)
	De-sophistication • The Solar Sister model strength is that it is very simple and this simplicity enables it to be scalable from tens to thousands of women entrepreneurs. (6E) • Our product is pretty sophisticated inside using MCU (microcontroller units) but I do try to design it in a modular fashion which makes replacing parts easy for schools in rural areas. (51E) • Non frugal silicon valley is all about high tech sophistication. (39F) • However even impact investors have a difficult time investing in developing market low sophistication and low cost innovations. (10I)
Scope of Solution	**Product** • Initially we imported pads but found that the pads were clogging toilets and were not biodegrading creating greater health risks. So we came up with a patent pending chemical less process to manufacture biodegradable pads. And the localization manufacture policy in South Africa and India helps to establish local manufacturing capability. (11E) • So I see frugal innovation as better engineering products that social enterprises need to develop. (15F) • Cost reduction innovation of existing products doesn't work. Take the example of OLPC. It hasn't achieved its target price and it is losing time to cell phones, the latter being more simple, yet powerful and ubiquitous. Simply reducing cost of existing products won't work. (19M) • Initially we imported complete systems at high cost from Brazil to Indonesia. But then we found a supplier in India from whom we import parts at low price and assemble locally in Indonesia using other local parts like taps. (22E)
	Service • Some people talk about the need to drive down the cost of our product. But although our end user and beneficiary are the kids and teachers, the buyer or customer is actually the schools, ngos, and government. Plus the $60-80 cost of the radio is only a portion of the total $250 of the package. The main chunk is the content or media. (51E) • Frugal innovation could be useful for us in collecting data to populate our database. We need SMS apps to be very user friendly. If we send too many SMS then it could cost too much to the end user to reply to our queries. (42E)

	• We see that social entrepreneurs have two broad problems, one coming up with a product or product based service and two distribution or supply chain management. This is why we decided to give students a choice of the two parallel modules: FI or Supply Chain management. (53F)
	Design • I use design thinking to setup new micro-franchise businesses such as ideation and prototyping, microlight marketing, and quick and dirty proofs of concepts. (32M) • Frugal innovation is a nice effort to partner technology with entrepreneurship to come up with novel solutions for social problems that are both chronic and acute problems. (34F) • I agree we cannot design in isolation of the USA for developing country applications. Our cookstove was first developed by Engineers w/o Borders at Berkeley. But our engineers went back and forth to Sudan and worked with a local engineer. Through this back and forth our cookstove went through 14 iterations and we reached the current price of $16. So I don't think we designed and developed in just Berkeley and just dumped the cookstove, rather we tweaked it over and over again as necessary. (46E)
	Servicing • Our product is pretty sophisticated inside using MCU (microcontroller units) but I do try to design it in a modular fashion which makes replacing parts easy for schools in rural areas. (51E) • Even the US, with its mass production systems has built the local ecosystem capacity to achieve long term sustainability and servicing. (52F) • A local person is trained to service the units and to liason with the company on usage stats. The person is nominally paid and hired to serve that role. (35E)
Improve Performance or Efficiency	**High Performance** • Here they rely on Moore's law to increase performance and lower prices. However in areas where I function, you need to do more than just that. (51E) • I used to work for Intel in USA and here (USA) it is about exceeding requirements with focus on sophistication. At Intel we outpace many of the technological features for use by consumers. However the Intel Atom processor was a change of mindset brought about by competition from OLPC. We redesigned the processor for low cost and good enough performance for netbooks. (4E) • Frugal innovation is about jumping or leapfrogging alternative solutions to use high tech and high quality but at affordable levels. (43F) • In reality frugal innovation may actually be very expensive to do for entrepreneurs. It is something they have to do when they face frugal consumers. Say for instance Lifeline technologies, has turned out to be very robust and expensive. And the same thing with D. Light. (37F) • One gets amazed at the way cell phones have leapfrogged with mobile banking in Uganda even in the remotest of areas and the banks don't even know what passed them. (49M)
	Efficiency • Cost per outcomes are an attempt by social ventures to be more financially relevant to investors. Reducing the cost per outcome also exhibit scaling up potential since one can do more with little. (1F) • To me it (innovation) is about solving a problem in the most efficient manner possible. (46E)

Table 5.10a: <u>Archival document</u> data supporting theoretical dimension of social innovation – 289 passages

Resolve needs and create aspirations	**Aspirational** • Trees, Water & People (TWP) uses a unique model of non-profit incubation, characterized by long-term collaborations with our partners that permits them to diversify their skills, grow their management capacity, pursue their aspirations, and actively test assumptions around regionally appropriate sustainable technologies. 2011S1 • ONergy creates an ecosystem which connects technology, finance and grassroot organizations - to manage the energy needs, aspirations and resources of rural BoP beneficiaries. 2011s28
	Needs • The reason that these products have failed to take off is that they do not address the full range of East African BoP customers' need for electricity at a price they can afford. Angaza Design's systems do. 2011s40 • These agencies simply place needy women at these houses, and take little responsibility beyond this placement.2011S9
Reach Out	**Scaling** • A percentage of our target market is not IT literate and some do not have computers to use our products. This becomes an issue in scaling to cover that market segment, even though they probably need our software most. 2011s16 • Need for middle management team – currently field staff needs to be closely monitored; this could be a road block for expansion and increasing scale. 2011s28
	Rectifying Inequity • And now we are poised to move in some very innovative directions, particularly with the UCLA/LAUSD project (the most successful project of its kind – they doubled and tripled the number of females and underrepresented minorities taking APCS classes in 2-3 years) and the subsequent national distribution and implementation program. 2007s79 • There are between 3-4 billion people with little or no access to critical information via any kind of media. In addition, they are not able to produce media in order to share information, challenges and successes in the fight against global poverty. Without the capacity, tools and mechanisms with which to communicate, they are relegated to a dark corner of the world without hope, without a voice. They have become persona non grata. The world's marginalized groups – women, poor, ethnic, caste and tribal groups, disabled, elderly, and people of color – have the greatest need for information. Examples of this include land rights, knowing how to work with government programs, women's health and rights, social injustice, training, community and economic development, agriculture, conflict, and even daily information like the weather and news. The lack of access to these channels of information is partly what keeps them in poverty. 2007s103
	Margins • This process will minimize the existence of information traders who lower the selling price of suppliers (decreasing their profit), and increasing the selling price to wholesalers (increasing cost). Poverty Alleviation in the agriculture sector. The elimination of information middlemen will allow farmers and fisherfolks to financially benefit from their produce and thus having more money in their pockets. 2006s109 • At present, reading glasses are sold exclusively by eye doctors and optical shops at significant margins making them too expensive for the average person. 2006s132
	Affordable • The key innovation is the Cleangold Sluice. Cleangold is a portable, easy to use, non-motorized, inexpensive gravity separation tool that uses small amounts of unclean water to separate fine gold and platinum from ore without chemicals. It has been independently tested at University of British

	Columbia's mining school, which showed Cleangold outperformed the industries' state of the art centrifuge which costs100 to 1000 times more. It also outperforms mercury amalgamation, capturing finer gold than mercury does and Cleangold also recovers oxide coated gold particles that resist mercury amalgamation. 2007s63 • The introduction of hand drilled wells in Niger has benefited over 1500 farmers and villages providing access to water at an affordable cost in a country where water is absolutely crucial and surface sources are rare. 2007s66
	Inclusiveness • To make it possible for every person who needs a wheelchair in developing countries to obtain one that will lead to maximum personal independence and integration into society. 2006s140 • THRIVE is an action research organization aiming to develop, showcase and implement technologies and processes of comprehensive development of the rural and underdeveloped communities in the areas of education, health, communication, rural lighting and water lifting. 2007s99
Develop Capabilities	**Economic Sustainability** • We have identified partner in Nigeria. Our equipments are really working (no charities) and sustainable in many ways as it gives employments to poorest in the society. 2007s86 • Our staff members should be oriented to take the task of creating profitable income generation activities for women. 2007s61
	Environmental Sustainability • To offer state of the art and own technology to solve frost damage problems worldwide. This environmentally friendly technology incorporates the necessary knowledge and know-how to study each orchard. Each system is custom designed and a Complete Study of the local microclimate and a set of passive frost control measures is presented for each project. 2005s151 • To make future customers understand the social and environmental impact they would have if they "bet" for our company. 2011S30
	Value Generation / Capacity building • Once approved, we deploy the whole business model in order to determine viability of the project in all the areas involved up to commercialization and profitability throughout the whole value chain. 2011s26 • The "Community Video Unit" approach to producing monthly "Video Magazines" as a basic form of participatory media is our primary example of a base model of capacity building and technology that is then shaped for local demands towards specific goals. 2007s103 • The approach begins with an active stakeholder dialogue to refine technology development and dissemination strategies; it ends with technical assistance and capacity building to enable local businesses and organizations to implement Envirofit solutions long after we have left. 2007s67
	Learning • We assume that a change in culture won't happen until the society has the opportunity to go through a learning process, having live experiences with disabled people. From these ideas, Unidos takes its mission. 2005s162 • We are in the process of training literacy assistants for ICT trainings who will be trainers of others. 2005s160
	Self-sufficiency • We intend to create a network of schools and educational leaders interested in self-sufficiency and the application of innovative solutions for the common good. 2005s152 • Ensure self-reliance of rural landless by technology mediated trainings and credit, now they have better access to land-water bodies and able to carry educational expenses of their children at higher educational institution. 2006s135

Table 5.10b: Interview data supporting theoretical dimension of social innovation – 144 passages

Resolve needs and create aspirations	**Aspirational** • Most of our customers prefer the more expensive $50 D.Light over the $5 one. Perhaps it is a dual purpose with cell phone charger. (28E) • My colleagues here agree that a lot of customers are looking to go with high end products perhaps to be aspirational and high status. (28E) • We are focused on advocacy and training to raise awareness of taboo issues (women sanitary pads). Once the awareness is created, individuals naturally seek out sanitary pads. We cannot even donate pads in an environment where they aren't culturally or socially accepted. (11E)
	Needs • As a marketing person I think it is understanding needs and not just making it cheaper or affordable. (8F) • The user needs in developing markets are very different from those in Western nations, so we must place utmost relevance on defining user needs. Even the platforms, to use computer engineering language, would be different or none exist. (40F) • Frugal Innovation is about design for social problems, needs and contexts such as supply chain and lack of infrastructure concerns. It is all about common sense and de-sophistication. Recall the NASA ball point pen for $5m versus a $1 pencil. (8F)
Reach Out	**Scaling** • Cost per outcomes are an attempt by social ventures to be more financially relevant to investors. Reducing the cost per outcome charts also exhibit scaling up potential since one can do more with little. (1F) • Our whole model rests on training in house and in large volumes. If a private hospital does two surgeries per day per doctor, then Salauno has to do ten in comparison. (44E) • One such self imposed constraint is self-reliance. It sounds quite counter-intuitive to think "we don't have money, nor do we have access to it, but we want to be self sufficient". This helped create a business model which led Aravind to scale and differentiate from other eye care charities who had access to some funds but turned out to be a limiting factor for their growth. (33M)
	Rectifying Inequity • The hospital values dignity as well as quantity. Poor consumers don't have the liberty to take economic risks, so they have to make a final choice or none at all, which one has to realize is a choice too! (33M) • The development of GSMA standards helped to lower cost of technology for all to be able to afford. And mobile is probably the only sector through which MNCs have innovated widely for the BOP. (2M) • A lot of students now realize they need to design solutions for the rest of the world not just for the USA because i) the markets are there for both MNCs and entrepreneurs ii) the Jesuit mission to help the underserved poor. (39F)
	Margins • Our margins are calculated based on i) affordability of BOP, ii) offers from competition, and iii) enough to make money for our women entrepreneurs. (6E) • Most term sheets from VCs to our type if impact businesses will make even the VCs brush on how harsh they are on the social enterprises. (2M) • A challenge is how we move away from maximum margins to reasonable margins for all in the value chain. (30E)
	Affordable • Children drop out of school in these inner most remote schools because parents have to spend like 5-10cents on candle or kerosene everyday. So to enable a child to study at night equates to 3-5 dollars expense on 30 dollars of monthly income. (35E) • I told GE that 10-15% cost reduction as being talked about means they are not serious in addressing the BOP. Instead they need a 10 fold decrease. (2M)

	• Sometimes cost reduction may not always be great. It may be good for the enterprise but not for the farmer who serves as a seller. (29F)
	Inclusiveness • In terms of capital resources, money is probably the easiest part of setting up eye hospitals. If you put in enough money you could create 20 hospitals, but they probably would not have the same ethos: Providing vision to all, and seeing all as one. (33M) • Research 1 universities are more focused on gaining the NSF grants awarded to large sophisticated projects. We have a more humble approach as we focus on helping the underserved. (52F) • I am dismayed that the feedback through the GSBI programme is making us let go of our impact oriented BOP segment in favor of a more business worthy higher mid-segment. (23E)
Develop Capabilities	**Economic Sustainability** • However now the challenge for us is to provide sustainable entrepreneurship for these families. (24M) • The World Bank and such international organizations aren't doing enough, in fact they put strings such as privatization to basic human rights such as water, which isn't right. Entrepreneurship for such challenges is the path for charity and grants cannot be sustainable. (49M) • Money is being changed in the ways it is deployed. Grants are great, but even nonprofits are moving away from grants to earned income. (48I)
	Environmental Sustainability • Initially we imported pads but found that the pads were clogging toilets and were not biodegrading creating greater health risks. So we came up with a patent pending chemical less process to manufacture biodegradable pads. And the localization manufacture policy in South Africa and India helps to establish local manufacturing capability. (11E) • We use local resources, of the few available, to enable low cost and long term sustainability. Although initially the costs may seem high, over time due to self sufficiency and sustainability the end costs incurred are lower. There was an article in NYT about Haiti's reconstruction after the earthquake and it was an evaluation of the different approaches. The localized approach was not only cheaper but more sustainable. (52F) • I am aware of the appropriate technology failures. Problem with that was that it was all about localization, to the extent of designing mud cook stoves. Still some NGOS have the same mindset. Our partner Oxfam insisted that we do not import shape sheet stoves from India despite their success with the local women. They (Oxfam) wanted it done all done in Sudan. The problem is that local fabrication would add additional costs to the final price and not really create any substantial jobs. Reason is this activity is tool and capital intensive and not so labor intense. It would not create any jobs in Sudan and plus it would be very costly to begin such a fabrication facility. I told them no, want to do it the most efficient means so ordered the sheet metal from India to be assembled together in Sudan. (46E)
	Value Generation / Capacity building • So a key lesson is that you always focus on the long term value you create for the client, not just the product you sell. This will define your business model including pricing and production. However, it is difficult to say what this means for developing country social enterprises. We need more research in this. Some cases like e-Choupal show that you can't just take a product centric or service centric view, you have to do both within the value created through your business model. (53F)
	Learning • If there is one thing I would, that is to make executives of large organizations aware of the opportunity in large BOP population markets. As CEO of the company I ran, I would now go back and have a project team working on for instance cook stove combustion, not just to fulfil the need, or opportunity for profit, but to learn from new contexts and constraints. (41M) • Although these lessons are from social enterprise, the lessons could be useful for all firms wishing to lower costs. (12F) • On learning from us, we do 300K surgeries a year and have enabled others to do another 1 million a year. (33M)

6 INTEGRATIVE RESULTS AND THEORY DEVELOPMENT

6.1 Introduction

In this integrative chapter I suggest theory development based on models of innovation among social entrepreneurs from the previous two chapters. In particular, I propose a theory of frugal innovation that draws conceptual inspiration from mainly model 2 (figure 5.2) but also finds support in model 1 (figure 4.3). And while I develop the theoretical model of frugal innovation based on empirical data from this study, I cite support for it in published cases of innovation. The published accounts help to test applicability and relevance of the theoretical model to cases beyond the ones from which it was drawn. Finally I outline how sometimes concepts often confused with frugal innovation are discussed in existing literature and how my empirically based understanding of this concept fares in comparison.

6.2 Approach to theory development

Van de Ven and Poole (1988) and Poole and Van de Ven (1989) suggest that a paradox between different assumptions can be exploited towards theory development. For instance, Abrahamson (1991) used the paradox resolution approach and tools offered by Van de Ven and Poole (1988) and Poole and Van de Ven (1989) to come up with a theory of management fashion. In a similar fashion, I take advantage of the contrasting assumptions on innovation by social entrepreneurs to generate new theoretical perspectives for understanding innovation among social entrepreneurs.

Poole and Van de Ven define paradoxes as "interesting tensions, oppositions, and contradictions between theories which create conceptual difficulties" (1989, p.564). They

suggest clarifying level of analysis, taking time into account, and introducing new terms as tools to stimulate theoretical development through paradox exploitation. Abrahamson (1991, p. 601) believes that this technique can "generate tailor-made theories for varied innovations or contexts". And in contrast to the contingency approach of paradox resolution, this approach works because it does not assume that different perspectives apply to some and not to other innovations or contexts. The Van de Ven and Poole approach to theorizing is powerful because it allows for "flexibility necessary to generate theories that incorporate assumptions that match the innovation or context they study and, thereby, provide for stronger empirical findings" (Abrahamson 1991, p.601).

I introduce the term "frugal innovation" to stimulate theoretical development through paradox exploitation. As part of this approach, I have been consistent throughout on the level of analysis. Observations were at the level of individual entrepreneurs, rather than firms, but many entrepreneurs were speaking for their firms. The focus of analysis has been at the conceptual level of innovation. The level of analysis was also discussed in chapter 4. It was inferred from the findings that social-based innovation in model 1 was best understood to occur at the community level of analysis, the efficiency-based innovation at the firm level, user-based innovation at the individual level, and challenge-based innovation at the sectoral level. As this was not a process study, I do not introduce time.[13] I can nevertheless attempt to use paradox resolution for theory development because two of the three suggestions Poole and Van de Ven recommend have been adopted. In particular, the theoretical approach I attempt here has strong potential for explanatory power particularly because the assumptions of innovation under resource constraints, institutional voids, and affordability concerns that

[13] I could however attempt to do so in future studies by coding variations in innovation summaries from application forms over the years, but for this I would need the missing data of years 2008-2010

underlie this theory development match the context (Abrahamson 1991) in which I hope researchers will test this theory.

Like social entrepreneurs, many organizations, both for-profit or non-profit, are looking to meet the needs of people who are underserved by existing businesses and non-profit organizations (see for instance Prahalad 2005; Easterly 2006; Collier 2007; Polak 2008; Novogrotz 2010). While some organizations follow a for-profit model, others use a non-profit or even hybrid organizational approach. These organizational models stem from fundamentally contradictory assumptions on profit maximization on the one hand and social impact on the other hand. Social entrepreneurship offers a middle ground where the two aren't necessarily contradictory (Elkington and Hartigan 2008), yet there is continued struggle to balance the degree of focus on profit maximization and social impact. Social entrepreneurs also commonly face challenges of dichotomous philosophies around delivering 'more with less' or achieving 'more is better', lowering cost or maintaining high quality, functioning creatively within constraints or benefitting from access to slack resources, focusing on localization or eyeing globalization strategies, filling institutional voids or resolving institutional complexities, pursuing adaptability or optimization and efficiency, and achieving scale or maintaining sustainability (see figure 6.1). Indeed, mainstream entrepreneurs may also be concerned with these challenges, but because of the hybridization strategy of profit maximization and social impact, social entrepreneurs may face a higher degree of concern for balancing these tensions.

<See figure 6.1, page 303>

My findings suggest these contradictory assumptions partly stem from differences across the logics of justification that social entrepreneurs rely upon in viewing innovation

models. I identify these contrasting logics as an opportunity to suggest new theory for better understanding innovation as conceptualized by the respondents in this study. I draw upon the common themes across these contrasting logics and use the new concept of frugal innovation as referred to by the respondents to develop a cohesive view that provides some common ground for these varied perspectives.

But recall from chapter 3 on methodology, that I caution that these views of innovation reveal models that are 'socially constructed' among social entrepreneurs. Consequently these views may not be seen in the same way by those who are not social entrepreneurs or even those social entrepreneurs who do not fall within the contextual characteristics that mark the informants in this study (see chapter 3, section 3.3). Nevertheless, although the models themselves are not necessarily universally and materially 'objective', as is the case with qualitative studies based on unique and interesting cases, I argue these models and ideas can lead to material outcomes to help develop theory which can be further tested to ascertain degree of robustness and generalizeability.

The first model of innovation arose from an empirical investigation of the first sub-question "How do social entrepreneurs conceptualize innovation?" This revealed a model composed of four types of innovation that find support in existing literature. The model also revealed the drivers or motivations for adopting these types of innovations. The second model arose from the next two sub-questions which in turn build upon the first sub-question by asking "How do social entrepreneurs conceptualize innovation under a) resource scarcity and under b) institutional voids?" That is, while the first sub question focused on innovation in general, the latter two focused on innovation under constraints.

I analyze the model of innovation under constraints outlined in chapter 5 to present arguments for new theory development of innovation among social entrepreneurs. I alluded to in the discussion of chapter 4 that the concept of frugal innovation may serve as a boundary object to link innovation by social entrepreneurs to more mainstream concerns of innovation, such as those prevalent among for-profit large corporations. The contestation and negotiation (c.f. Smith 2007; Hess, Campbell and Martin 2007) of boundary spaces (Lamont & Molnar 2002; Star 2010) where different motivations, agendas and definitions of innovation spaces is occurring promises to ignite a new sub-field in innovation studies on frugal innovation.

I expand on that possibility by showing how the conceptions of innovation among social entrepreneurs revealed in this study also relate to popular examples found in existing literature. I hypothesize that the forthcoming theory of innovation may apply to a broader set of those globally networked and recognized social entrepreneurs involved in "frugal innovation". In the appendix A.7 I attempt to show the limited generalization of the theoretical models by analyzing the perceptions of a small sample of innovators at another research site 'B'.

6.3 Theory development of frugal innovation

In chapter 5 I revealed that social entrepreneurs conceptualize using technological innovation to address resource constraints, social innovation to address affordability constraints, and institutional innovation to address institutional voids. However, I also showed how the three innovations taken separately cannot deal with the challenges of innovating for the underserved, a common theme across all social entrepreneurs, as this population faces a mix of constraints. We may be able to use the different assumptions

behind the different conceptualizations of innovation under constraints to build theory for innovation for the underserved and under constraints.

I draw upon a number of existing theories such as resource-based view (Barney 1991; Peteraf 1993) resource-dependence (Pfeffer and Salancik 1978), competitive advantage (Porter 1995), and creating shared value (Porter and Kramer 2011) to understand how social entrepreneurs may navigate resource, institutional, and social barriers or challenges. As shown in the previous chapters, I find from a process perspective that technology innovation helps to address or resolve the challenge of resource constraints, institutional innovation helps to address the challenge of institutional voids, and social innovation helps to address the challenge of affordability constraints, all three together which are necessary parallel approaches to deal with innovation for the underserved in extreme contexts, i.e. those marked by institutional voids and resource constraints. I also find from an outcome perspective that broadly speaking and not exclusively, technology innovation through consideration of design of solutions helps to make the innovation adaptable to specific contexts, social innovation through consideration of economic and environmental sustainably and self-sufficiency helps to make the innovation affordable, and institutional innovation through rethink of soft and hard distribution challenges such as advocacy, legitimacy and infrastructure helps to make the innovation accessible (see figure 6.2) .

< See figure 6.2, page 303>

Schumpeterian or technology innovation is characterized by the primary concern for pursuit of profits, social innovation by the concern for creating greater social value, and institutional innovation by the mitigation of discontent with existing practices by introducing

new practices, norms, and regulations. If social entrepreneurs focus on generating and retaining profits for growth or dividends, they do so by also improving social value creation. If social entrepreneurs focus on changing existing institutions, they do so in a way that preserves or builds upon local social values. And if they focus on greater social value creation, they do so in a manner that is economically sustainable and scalable for growth of the organization.

I analyze the intersections among these three innovation streams as fertile spaces where a hybrid form of innovation occurs – one which my respondents call 'frugal innovation'. In support of hybridization Denrell, Fang and Winter (2003, p.11) drawing from the work of Herbert Simon write about using existing systems to create new ones: "A complex system is unlikely to emerge if it requires that numerous elements are simultaneously combined. It is much more likely to emerge if it can be assembled via existing subsystems." At a very basic level my theoretical approach on juxtaposing the different perspectives of existing notions of technology innovation, institutional innovation and social innovation helps us to not only understand each individually as they occur among social entrepreneurs but, perhaps more importantly helps to develop an understanding of where frugal innovation may occur, i.e. in contexts marked by constraints. The relevance of frugal innovation as a new term reflects the uniqueness of this overlapping space and offers tools to build new insights from the merger of existing elements. Consequently, the forthcoming promise of theory development may help us to understand frugal innovation from one setting to another such as between product and service, profit and not-for-profit, start-up to large MNC, and between developed and emerging markets.

Several data passages supported the notion of overlapping approaches to innovation and merger that extend beyond traditional boundaries of innovation. Based on this supporting data, I hypothesize that frugal innovation lies at the overlaps or intersections of the three innovations -- technology, social, and institutional innovations. In the next three subsections I expound these intersections and overlapping concerns for innovation as spaces for paradox resolution and theory development for frugal innovation.

6.3.1 Intersection of technology and social innovation

The notion of overlapping concerns of technology innovation and social innovation was revealed by empirical data. The following three exemplary quotes are drawn from each of the different sources of data. The first two support triangulation of the findings based on interviews and documents from research site A. The third quote from interviews from research site B suggest that this finding may be generalisable to other communities of social entrepreneurs who are globally networked and recognized as social entrepreneurs. Additional supporting data quotes from each of the three data sources that support overlap of Schumpeterian or technology and social innovation are depicted in table 6.1a.

<See table 6.1a, page 307>

> *"Originally energy was not a developed goal. But now it is realized that all priority issues of health, education, and income are alleviated through access to energy." (1F interview, research site A)*

> *"We are not a technology company but a business development house that uses technologies innovatively for socio-economic benefits. I stress the fact that it's not about the technology, but it's about how technologies should facilitate the most basic human needs. We get bogged down on solving the problems of the world through a*

gadget rather than identifying the problems first then introducing the appropriate technologies to enrich human lives." (2006s139 document, research site A)

"Beyond that we wanted to design a human scale device so not something that would hook-up to a tractor, not something that would use draft animals, something that anyone in the family could use. So something that one person could easily maneuver through a field. We also had the goal of being able to fertilize a hectare in a day, so 8 hours for one person. Prior to the applicator, the time it takes to fertilize a hectare was between 8-10 days. We wanted to bring that down by a factor of 10. So yes, that is a lot of efficiency gain." (B3E interview, research site B)

In this overlap between technology innovation and social innovation, I exploit the paradox between two contrasting assumptions behind technology or Schumpeterian and social innovation to propose the need for theory development in this space. I begin with Schumpeter's (1934) seminal notion of innovation. This type is often associated with technology innovation (see for instance Christensen et al 2001; Geroski 2003; and Utterback 1994). Schumpeter attributed the innovative waves of "creative destruction" first to entrepreneurs and then to large corporations. The shift to large corporations was in part because of the resources controlled by organizations. Yet today innovation is considered the playing ground for entrepreneurs. But regardless of who innovates, there is little debate on the need to access and control resources for innovation to occur. The procurement, control and combination of labor, skills, and material is crucial to the creation of new products and services (Schumpeter 1934; Shane & Venkatraman 2000).

The unstated assumptions behind Schumpeterian innovation is the pursuit of profits and the ability to innovate when resources are available and controlled. Take for instance, entrepreneurs who need to mobilize resources to innovate and start new ventures (Shane and Venkatranam 2000). Thus entrepreneurship researchers have analyzed how new ventures

mobilize resources (Hsu 2008; Shane 2000; 2003). The probability of success in procuring these resources has been dependent on conditions such as the nature of the opportunity (Low and 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). The literature has focused more on the mechanism of resource seeking while assuming that resources are available in the environment.

The contexts in which social entrepreneurs function in may not have the necessary resources available or the means to access or control resources that might be available. An environment is resource constrained if it provides new challenges, whether opportunities or problems without providing additional or new resources (Baker and Nelson 2005). In such contexts resource constraints are faced by both entrepreneurs and large corporations. Despite resource-constrained environments, social entrepreneurs in my research sample claim to be creating affordable and innovative products and services. But how might they be doing so, given resource constraints?

Desa's work (2009) on technology social ventures suggests that entrepreneurs are able to provide services and products where none existed because of bricolage processes. Both Desa (2009a; b) and Gundry et al (2011) show that 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 by relying on bricolage (Baker & Nelson 2005; Levi-Strauss 1967) as a resource mobilizing mechanism. Bricolage involves friends, family and volunteers for labour, purposely look for pre-existing materials for reuse, and build upon existing skills to allow a venture to originate and build capabilities

for sustainability. Social entrepreneurs who deploy bricolage are able to mobilize resources for their operations and thereby provide solutions that would be otherwise unavailable to users, for instance because of poverty or lack of access. Desa writes, "by rendering unique services in resource-poor environments, and by finding ways to maintain financial sustainability, entrepreneurs can create markets for services where previously none existed." (p.201)

The notion of creating markets by entrepreneurs where none existed for underserved populations ties Schumpeterian innovation to another approach to innovation – that of social innovation. Social innovation is defined in the Stanford Social Innovation Review as a "novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals" (Phills et al 2008, p. 36). Phills et al differentiate social innovations from ordinary innovations because the world is already amply equipped to produce and disseminate ordinary innovations. They argue that when markets fail to produce for instance public goods, social innovation offers a way to meet needs and create value that would otherwise not be possible.

In contrast to the Schumpeterian pursuit of profits to innovate, the assumption in social innovation stems from a growing consensus on addressing social objectives which improve living conditions. Prahalad (2005) interprets social entrepreneurship to include entrepreneurship in emerging and developing markets that improves the economic and social conditions of the poor and underserved communities. Social entrepreneurship meanings have ranged from the non-profit definition to the broader enactment of positive social change. These social aspects can extend from societal needs such as justice and fairness to health, education and environmental and cultural preservation. Phills et al (2008) define social value

as the creation of benefits or reduction in costs for society in ways that go beyond the private gains and general benefits of market activity. The benefits of these social objectives are to extend to society as a whole, including the underserved. This highlights the need to deal with both resource constraints as a process of innovation as well as affordability constraints as an outcome of innovation.

Underserved and neglected populations are unable to pay for basic goods and services such as healthcare, food and housing. Consequently, unfettered markets will not produce these goods and services for such populations. However with greater cooperation among non-profits, government, and business, new models of funding are triggering even profitable social innovations (Phills et al 2008). Social innovation embodies creative and innovative solutions to social problems, often operationalized through entrepreneurial activity. Concomitantly, social innovation encompasses new means and processes such as ideas, strategies, and organizations that enhance the social aspects of human function and civil society.

One example of social innovation is Ibrahim Abouleish's Sekem Initiative in Egypt. The community scheme reduces poverty, generates employability for rural farmers, and conserves natural resources. By applying organic agriculture techniques, Sekem contributed toward maintaining the regional natural environment (Seelos & Mair 2005). A financial return for profit though important is often equally balanced or outpaced with the desire to achieve social impact. Although I do not discount the private gains through market activity, the awareness of these opportunities to serve the underserved has attracted a number of efforts to address the problems of the poor through a combination of both market and non-market means (Mair and Marti 2006).

Citing the example of community based co-housing models, Seyfand and Smith (2007) explain these are primarily social innovations but also ones where sustainable technologies are fostered. They write, "social innovations and the diffusion of technological innovations are intimately linked." (p.588). Combine social innovation concerns with technology innovation, and a space develops for products such as the Aravind Eye Hospital and Jaipur Knee. The Aravind Eye Hospital merged the market and nonmarket approaches into their hybrid business model to serve upscale patients profitably and use surplus revenue to subsidize free eye surgery for the bottom of the pyramid (Rubin 2007; Mehta and Shenoy 2011). When social innovation serves the underserved, it has to deal with lowering costs to meet purchasing power of target market. So Aravind hospital reinvented the intraocular implant to avoid an import cost of $200 by building local capacity to manufacture it at just $5 a unit. According to two of my research respondent's, Aravind was able to become a successful social enterprise by frugally innovating. This activity took place at the intersection of social and technological innovation, whereby technology was reinvented to overcome resource constraints in procuring expensive intraocular lenses and social innovation built a hybrid model to meet the needs of all strata of patients. This as shown in chapter 4 embodies their mission of "To see all as one; to give sight to all".

Joel Sadler another interview respondent, designer of the $20 Jaipur Remotion Knee and having worked at Apple, argues that working under formidable business constraints are what enables "extreme" products like the Apple Ipad, Airbook, and Iphone. Although Apple is more focused on performance metrics than price, it is there that Sadler learnt to innovate under the constraint of price-points as demanded by low-income customers. The result was a redesign of the prosthetic knee joint down from $5 thousand to a $20 low cost, simple, easily manufactured, and high performance device. It was noted as one of the top 50 inventions by

Time magazine 2009. See figure 6.3 of the frugal innovation space Jaipur Remotion knee positions itself, a space which was made obvious only from concerns emanating from their social enterprise partner Jaipur Knee in India. In support of this figure and positioning of high quality and low price, Carlos Haertel, managing director of GE's European Global Research Centre, says cheap does not mean low quality. In fact, "a doctor's option for a stethoscope is either to have a cheap one or nothing. An unreliable one is just not an option at all." (Woodward 2011, online).

<See figure 6.3, page 304>

Entrepreneurs and firms are seeking to resolve both the economic and social concerns for extreme customers such as the base of the pyramid, in extreme environments marked by resource and affordability constraints. Working under these business and social constraints can force one to rethink both the process and outcome of innovation. As suggested by Poole and Van de Ven's (2006) paradox resolution theory development approach, this rethinking needs to be reflected in new concepts and terminology. As espoused by respondents, I suggest a new terminology that reflects this hybrid form of innovation is 'frugal innovation'. We see that social entrepreneurs propose to use a mix of Schumpeterian or technology innovation as part of the process of overcoming resource constraints, or doing the most with the little that the firm controls, and propose use of social innovation to assure the outcome of innovation is affordable and accessible to improve the lives of underserved. So I contend that a mix of economic and social concerns bring about a change of attitude in innovating at the intersections of technology and social innovation spaces that lead to the following propositions:

Proposition 1: *A mix of technology and social innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation.*

Proposition 1a: *Social entrepreneurs combine technology innovation and social innovation as part of the process of dealing with resource constraints and affordability constraints.*

Proposition 1b: *Social entrepreneurs combine technology innovation and social innovation to assure the outcome of innovation is adaptable and affordable.*

6.3.2 Intersection of institutional and social innovation

The notion of overlapping concerns of institutional innovation and social innovation was again revealed by empirical data. The following three exemplary quotes are drawn from each of the different sources of data. They support triangulation of the findings based on interviews and documents from research site A. The third quote from interviews from research site B suggest that this finding may be generalisable to other communities of social entrepreneurs who are globally networked and recognized as social entrepreneurs. Additional supporting data quotes from each of the three data sources that support overlap of institutional and social innovation are depicted in table 6.1b.

<See table 6.1b, page 308>

"Kenya currently does have local alternatives to insurance, but these are often mobilized after a catastrophe. So we show our prospective farmer clients the benefit of formal insurance." (45E interview, research site A)

"Our innovative approach has led to the development of pioneering methodologies that promote community leadership, locally driven natural resource management, and a communicative culture that encourages our partners to share best-practices and

skills with each other, fostering true regional collaboration and sustainable development." (2011S1 document, research site A)

"Our partner was having lots of problems with sanitation because it is a rural area, with no government infrastructure, and long distances. So they wanted us to help rid the problem of open defecation. And they also had a need for load carrying over long distance rough roads." (B7E interview, research site B)

In the overlap between institutional innovation and social innovation as indicated in the model 6.3, I exploit the paradox between two contrasting assumptions behind institutional and social innovation to further the idea of theory development for frugal innovation as proposed in the preceding section. Findings in chapter 5 showed that social entrepreneurs are not just innovators of products, services, technologies, but also innovators of institutions. Although institutions are the hardest to change, but that is where the greatest opportunities lie since those few who are able to change them, possess a capability that is very scarce (Haque 2011).[14] In markets where institutional voids exist, market failures offer fertile ground and new spaces for business activity.

One stream of entrepreneurship literature looks at whether social entrepreneurship happens through or against existing institutions. Institutions that achieve consistency, impartiality, and reliability in their enforcement allow entrepreneurs to form expectations about the future, such as whether to invest in innovation, by removing some of the uncertainty about whether they will be able to capture the value they create (Baumol 2002). While most ventures operate with the assumption their activities will be supported by formal institutions, other ventures may have to emerge despite a lack of institutional support

[14] In researching over 250 companies, Haque found less than 20, or about 8% were institutional innovators. Such companies were not just marginally outperforming rivals, but structurally disrupting competition.

(Sarasvathy 2006). Research on institutional effects has shown that institutions can both support and preclude actors, entrepreneurs, and ventures.

Sarasvathy (2006) points out that social enterprises are sometimes forced to go against existing institutions and come up with creative mechanisms that incorporate the best of both market and non-market solutions. Dean and McMullen (2007) show how according to the entrepreneurship literature, entrepreneurs can seize opportunities that are inherent in environmentally relevant market failures. Social enterprises may serve as the bridge between underserved communities and existing institutions (Wallace 1999; Bayliss 2004). Bricolage, as outlined above, often goes against the norm and occurs in the absence of institutional support (Baker & Nelson 2005; Baker, Miner, & Eesley 2003). Yet as social entrepreneurs act to mobilize resources they brush against existing political (lobbying), legal (business regulation), and technological (human development) institutional environments, or the lack thereof, and in the process may build upon the existing fragments to create new structures. Further, several needs or problems which social entrepreneurs take on are not addressed or even recognized by existing public or private institutions which leads the social entrepreneurs having to deal and operate within this basic institutional void.

In such cases, institutional entrepreneurs emerge as a case of necessity. Institutional entrepreneurship is one through which entrepreneurial actors change institutional structures or create new ones (DiMaggio 1988; Fligstein 1997). Institutional entrepreneurs "lead efforts to identify political opportunities, frame issues and problems, and mobilize constituencies" (Rao, Morrill, & Zald 2000, p. 240). An institutional entrepreneur actor develops new institutions or facilitates change in existing institutions, and secures resources to achieve this change. Institutional entrepreneurs are actors who have an interest in modifying institutional

structures and norms, or in creating new institutions, structure and norms (DiMaggio 1988; Fligstein 1997). While I do not argue that my social entrepreneurs are necessarily institutional entrepreneurs, they may be deemed so based on their adoption of institutional innovation practices. A difference in form, quality, or state over time in an institution, which is novel or an unprecedented departure from the past, is institutional innovation (Hargrave and Van de Ven 2006).

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 and Marti 2006) An example stemming from my own data which was described in chapter 5, is of a social entrepreneur who faced failure when focusing on technology innovation to provide sanitary pads to a context where they were taboo and consequently failed to sell or even to be given out freely. The social entrepreneur therefore moved to institutional innovation by focusing on advocacy and awareness of the benefits of sanitary pads for not only girls, but everyone in the society. She slowly and gradually initiated a localized social movement for changing institutions of culture and meaning which were an obstacle to the sale and use of sanitary pads.

This early 'clash' against existing institutional arrangements occurred in the early days of Grameen (Yunus 2007). Microfinance widely touted as social entrepreneurship pioneered by Muhammad Yunus and the Grameen Bank, both having shared the 2006 Nobel Peace Prize, I believe is better explained as operating at the intersection of social and institutional innovations (see figure 6.3). The formation of a new microfinance institution and change of capital flows, lending, and savings patterns of the poor involves parallel efforts in institutional and social innovation. Additionally, social entrepreneurship often takes place at

the intersection of multiple institutions as it may have to deal simultaneously with the government, the market, and the community (Shaw and Carter 2007). Mair, Marti & Ventresca (2012) call this having to deal with institutionally complex environments drawn from their work on BRAC in Bangladesh. In creating microcredit organizations such as Grameen Bank and BRAC, these social entrepreneurs had to engage in institutional entrepreneurship by altering existing cultural, economic, and regulatory institutions (Dacin, Dacin, and Matear 2010; Mair & Marti 2009; McMullen 2011).

The overlap of institutional and social innovation can also be witnessed in historical accounts of the emergence of the recycling industry in the USA. Environmental degradation can be as the result of a market failure caused by existing institutional arrangements (Desa 2009). In the development of the recycling industry in the USA, Lounsbury, Ventresca, and Hirsch (2003) show how social movements helped to transform socio-economic practices and paved the way for the recycling industry and its market development. Social movements together with entrepreneurs can do so by outlaying proofs-of-concepts for the creation of sustainable businesses. As this proof develops, wider public perception is changed, and consequently the institutions governing those perceptions are reconfigured to accommodate the new market.

Institutional analysis when bridged with social movement theory (e.g. Clemens 1997; Rao 1998; Strang and Soule 1998; Armstrong 2002) in sociology sheds an understanding of how political struggles shape cultural meaning systems, socio-economic processes, and industry emergence (Espeland and Stevens 1998; Heimer 2001; Lamont and Molnar 2002). The radical social movement for recycling promoted marginal practices through social-movement-inspired non-profit recyclers which then became central practices to the

technology and for-profit actors (Weinberg, Pellow, and Schnaiberg 2000). In the emergence of the recycling industry labour intensive and often ad hoc non-profit voluntary recycling efforts were supplanted by more organized curb-side collection efforts promoted by for-profit models, yet depended on free household labour to clean and sort waste, thereby lowering the overall cost of the recycling process (Weinberg et al 2000). The ability to leverage mainstream policy negotiation along with grassroots activism was key to the eventual success of the recycling movement (Lounsbury et al 2003).

In this section, I have argued social entrepreneurs seek to resolve both the institutional and social concerns for customers such as those in the base of the pyramid or in extreme environments marked by institutional voids and resource constraints. Working under these institutional and social constraints can force one to rethink both the process and outcome of innovation which needs to be reflected in new concepts and terminology, as advised by Poole and Van de Ven (2006). I adopt the terminology espoused by respondents to reflect this hybrid form of innovation – frugal innovation. Social entrepreneurs propose to use a hybrid mix of institutional innovation as part of the process of overcoming institutional voids, by reconfiguring old or creating new institutions and structures, and propose to use social innovation to assure the outcome of innovation is relevant, affordable and accessible to improve the lives of underserved.

> ***Proposition 2:*** *A mix of institutional and social innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation.*
>
> ***Proposition 2a:*** *Social entrepreneurs combine institutional innovation and social innovation as part of the process of dealing with institutional voids and affordability constraints.*

Proposition 2b: *Social entrepreneurs combine institutional innovation and social innovation to assure the outcome of innovation is accessible and affordable.*

6.3.3 Intersection of technology and institutional innovation

In the third overlapping intersection in the model 6.3, I look at Schumpeterian or technology innovation and institutional innovation as another fertile space to exploit the paradox resolution approach. I use the two contrasting assumptions behind technology and institutional innovation to again argue for theory development for frugal innovation. The notion of overlapping concerns of technology innovation and social innovation was supported by empirical data. The following three exemplary quotes are drawn from each of the different sources of data. The first two support triangulation of the findings based on interviews and documents from research site A. The third quote from interviews from research site B suggest that this finding may be generalisable to other communities of social entrepreneurs who are globally networked and recognized as social entrepreneurs. Additional supporting data quotes from each of the three data sources that support overlap of technology and social innovation are depicted in table 6.1c.

<See table 6.1c, page 309>

"We are not setting up a micro-insurance industry. We are using technology to link the insurance providers to those who need it." (45E interview, research site A)

"The biggest obstacle to future growth overcoming the "Aid" mentality – this mentality exists on two levels: In the communities where the Solar Sister Entrepreneurs are trying to sell their products, they have to convince customers that improved technology is something they can purchase for themselves rather than expect some NGO to come and provide for them." (2011s17 document, research site A)

"If you were a big company designing knee joints, it would take you a long time before you put a test knee joint on a patient. It would take you time to get through all the safety and regulatory concerns. But in India they put it on a patient the next day we landed there." (B6E interview, research site B)

Both social movement and technology innovation management researchers have studied the institutional arrangements in which institutional change takes place, as well as the efforts of social activists and technological entrepreneurs to enact these arrangements. Hargrave and Van de Ven (2006) juxtapose technology innovation literature and social movement literature to come up with a model for collective action model of institutional innovation. Entrepreneurs and social activists both engage in political processes that often resemble social movements (DiMaggio and Powell 1991; Fligstein 1996; 2001; Rao 1998; Snow and Benford 1992). At this macro level of the inter-organizational field, the processes of technological innovation and entrepreneurship have many similarities to social movements (Aldrich and Fiol 1994; Lounsbury and Ventresca 2002; Schoonhoven & Romanelli 2001).

The co-evolution of institutions such as professional associations, government policies, and market rules alongside technological development has been documented in the works of Hughes (1983) and Walker (2000). Green (1992) has examined how a market may not exist for a new technology and may have to be shaped. For a market to exist, institutions must first be in place to establish prices, to inform customers and suppliers, and to provide distribution arrangements. Entrepreneurs developing radically new technologies must often engage in collective action with others to create these institutions. Bower and Christensen (1995) have examined the case of disruptive technologies, where information about potential customers, dimensions of product performance important to customers, and acceptable pricing level can only be acquired by experimenting with both the development of the product and the market.

The founder of IDEO, Tim Brown and head of IDEO's Social innovation group, Jocelyn Wyatt's "Design Thinking for Social Innovation" advise that when designing for developing nations, one not only considers form and function, but also distribution channels (Brown and Wyatt 2010).[15] They cite the example of northern Ghana where a programme for providing free nets to pregnant women and mothers with children under age 5 was so successful that for everyone else, however, the nets became difficult to obtain. For those not eligible to obtain free nets from public hospitals, there was no market for nets as it was not profitable to sell nets. Such is an example of where neglect of the whole system, had detrimental effects on those not within the scope of the current distribution scheme thereby making the eradication of malaria impossible (Brown and Wyatt 2010).

In the previous section I discussed how Grameen specifically, but microfinance in general exemplified hybrid innovation covering institutional and social innovation. Over the past decades, microfinance has utilized mobile technologies to achieve even greater penetration and broader scope of service. Mobile phone banking companies in emerging markets, M-Pesa in Kenya, Telenor EasyPaisa in Pakistan and EKO in India, though all three are technology companies, innovate at both the frontiers of technology and institutions. They help connect the poor "unbanked" underserved segment of the market to existing financial institutions, or lack thereof, by leveraging the ubiquity of mobile technology. Telenor EasyPaisa worked with the government to devise the world's first regulatory mobile banking model. Given that Pakistan has less than 10,000 traditional bank branches (State Bank of

[15] Executives are increasingly designing for innovation (Van de Ven, Ganco, and Hinings 2013). And as opposed to the engineering and analytical approaches of the past, they are doing so by pursuing more artistic and generative approaches to design (Boland and Collopy 2004) through design thinking (Brown 2008). For our purpose, in the last decade design thinking has spread beyond the field of product design from where it originated to become widely adopted in the social field (Brown and Wyatt 2010).

Pakistan 2011) for a 180 million population, the EasyPaisa model has already surpassed that figure with 12,000 mainly rural franchisees serving as financial agents and bank kiosks, with fast following competitor United Bank Omni having setup 5,000 (Bold 2011). Easypaisa have brought in more people through this unique "lowcal" strategy (Bhatti, Khilji, & Basu 2013), one that is both local and low cost, into the formal economy using their mobile technology infrastructure than ever possible through traditional institutionalized bank models alone.

In another example, EKO, one of the respondents for my data collection, bypassed the mobile companies to create a technology based mobile phone app that works on any network (and any phone) and links major banks such as ICICI with thousands of mom and pop shop owners who serve as bank tellers. EKO's CEO Abhishek Sinha claims their most socially valuable customers are household domestic maids who can now save money in their own bank accounts and access their funds virtually throughout India. These frugal innovations created different business models in each of their respective environments ranging from the absence of bank involvement in Kenya, mobile led in Pakistan, and entrepreneurial broker led in India. Yet all help lower entry barriers for the financially underserved to benefit from savings, investments, and insurance markets to achieve inclusive growth.

Even in the US, the emergence of new internet business models brought about by Ebay for everyday selling and E-Trade for investments options for those often excluded from the markets is made possible by innovating at the intersection of technological and institutional arrangements. Ebay and E-Trade used internet technology to restructure market institutions of buying and selling goods and services. And some of these like Ebay may have begun as grassroots solutions to personal problems faced by founders. Additionally, Eric

Topol (2011) Chief Academic Officer of Scripps Health and Professor of Genomics cites a $8K pocket ultrasound device as an example of frugal innovation that does just a decent job of visual scans as a single $2K professional and technical scan done by conventional machines in a US laboratory. He believes although such frugal innovations abound in the healthcare sector, their use or adoption is hindered by the reimbursement rules and economic models that physicians, insurers, and hospitals rely upon. Therefore, eventual adoption depends not only on technological prowess of frugal innovations but also in restructuring or working around existing institutional structures.

We learn in this section that social entrepreneurs working under resource constraints and institutional voids makes us rethink both the process and outcome of innovation. As part of this rethinking, I argue once again, that frugal innovation is a new concept that reflects the new hybrid approach to innovation (Poole and Van de Ven 2006). So frugal innovation is a form of innovation that stems from social entrepreneurs use of a hybrid mix of technology innovation to overcome resource constraints and institutional innovation to overcome institutional concerns or voids:

> ***Proposition 3:*** *A mix of technology innovation and institutional innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation.*
> ***Proposition 3a:*** *Social entrepreneurs combine technology innovation and institutional innovation as part of the process of dealing with resource constraints and institutional voids.*
> ***Proposition 3b:*** *Social entrepreneurs combine technology innovation and institutional innovation to assure the outcome of innovation is adaptable and accessible.*

6.3.4 The technology-social-institutional nexus (all three)

Finally, the overlapping concerns of all three, technology, social, and institutional innovations were also revealed by empirical data. The following three exemplary quotes are drawn from each of the different sources of data. The first two support triangulation of the findings based on interviews and documents from research site A. The third quote from interviews from research site B suggest that this finding may be generalisable to other communities of social entrepreneurs who are globally networked and recognized as social entrepreneurs. Additional supporting data quotes from each of the three data sources that support overlap of institutional and social innovation are depicted in table 6.1d.

<See table 6.1d, page 310>

"The development of GSMA standards helped to lower cost of technology for all to be able to afford. And mobile is probably the only sector through which MNCs have innovated widely for the BOP." (2M interview, research site A)

"Unlike other online marketplaces, e-Mobilizer is organized into local communities, bringing buyers and sellers together for face-to-face transactions. This solution is especially tailored to a market where 1) cash is still the main method of payment with no credit cards or other payment systems in place; 2) a poor logistics system makes long distance shipment difficult; 3) fear of fraud prevents people from doing business with someone they don't trust; 4) culturally, bargaining prices and negotiating deals are part of business practice." (2005s147 document, research site A)

"The d.school identifies problems and solutions by examining the intersection of human values, technology, and business. Jeon's project reflects this approach: a community focus, looking at underserved areas, taking advantage of mobile phones (the most common computer in many parts of the world), and aiming for low-cost solutions." (B11F online quote, research site B)

Along the lines of paradox resolution of conflicting assumptions, I contend that social innovations lie at one extreme of the spectrum where social value as a whole is of the greatest concern while ordinary innovations lie on the other extreme where profits and value accrue to individuals who are often privileged ones who already are advantageously within the folds of markets. In the middle of this lies frugal innovation, which draws social value through a mix of social, technology and institutional innovation. Innovation blossoms at the intersections where the sectors converge because of exchange of ideas and values, shifts in roles and relationships, and the integration of private capital and public and philanthropic support (Phills et al 2008). Social enterprises routinely lie at the nexus of the public and private sectors (Dees 1998).

Seyfang and Smith (2007) support this multi-dimensional integration by citing Jacobsson and Johnson (2000) on that "specific social and technical practices are embedded within wider, facilitating infrastructures, which subsequently restrict opportunities for alternatives" (p.587). Mair, Robinson, and Hockerts (2006) and Shane & Venkatraman (2003) pose the challenge for researchers to apply theories of management to situations that are relevant to social entrepreneurs and technology entrepreneurs. What they have missed is the potential relevance to institutional entrepreneurs. Although isolation frees an emerging system from the institutional constraints of existing technologies and industries (Astley 1985) and permits the system to develop its own distinctive institutional forms (Rappa 1987), it is best considered in combination with social and technology concerns.

In technological innovation research it is proposed that knowledge bridging as a boundary-spanning mechanism can produce radical innovations and creative products (Hargadon & Sutton 1997; Hsu & Lim 2005). As ventures operate at the boundaries of

resource, affordability, and institutional constraints, I propose that knowledge-bridging mechanisms across the three types of innovation -- social, technical, and institutional -- help to explain the development of frugal innovations, particularly among social entrepreneurs, but possibly not limited to this type of entrepreneurial activity.

An example from among my interviews, is the Rickshaw Bank project in India which exemplifies a position at this nexus of social, technical, and institutional innovations. Sarmah (2010) set out to enable rickshaw drivers, most of whom are immigrant workers from the rural regions, to own rather than rent rickshaws. In the process, he used technology to redesign the rickshaw, social innovation to restructure the prevalent practise of renting to owning the asset, and used institutional innovation to license and recognize rickshaw owners as formal contributors to the local economy. The rickshaw community has thus been drawn from a bleakly structured informal economy and into the folds of the formal economy. This has also led the rickshaw owners to rent clean energy LPG cylinders at subsidized government prices instead of using firewood or expensive kerosene. Sarmah's rickshaw bank enterprise provides not only rent to buy rickshaws, but also damage and healthcare insurance. Any of the three innovations in isolation would have not likely have transpired. Yet by combining the three, Sarmah has been able to help more than 30,000 rickshaw drivers to benefit from the scheme. Plans are underway to use the micro-franchise model and scale to other parts of India to reach the remaining 8 million or so rickshaw drivers. Although the model seems scalable, we need to see to what extent Sarmah's business model will diffuse to the majority of market clients. The Rickshaw Bank project has redefined business models, reconfigured value chains and redesigned products to create more inclusive markets.

Another example comes from the US in the mid-1990s when Self-Help, a community development finance organization pioneered the secondary market for mortgage-backed securities based on loans to low-income households to enable greater access to homeownership. With cross sector partnerships between the non-profit Self-Help, commercial banks, federally chartered Fannie Mae, and private investors, the scheme grew from $50m in 1998 to $2.5b in 2008 (Phills et al 2008). Such a sophisticated scheme that relies on robust and varied institutions would unlikely work in emerging and developing markets. In contrast however, through a combination of technical, social and community based social innovations, for instance, low income housing schemes are being experimented with in emerging markets. Bahria Town of Pakistan, the largest private real estate developer in Asia, has packaged together technical innovations to lower the cost of housing construction, institutional innovation to enable financing for low-income household ownership, but also social innovations that make low cost housing schemes acceptable within the same larger housing schemes designed for the ultra rich (Bhatti, Khilji, and Basu 2013).

The findings in this research suggest an initial set of forces that drive and help explain the rise in frugal innovation activity which have been described as social, efficiency, user, and challenge based drivers. Further, an analysis of innovation under constraints suggests that a mix of innovation approaches is used to overcome constraints of resource, affordability and institutional voids. These spaces where innovations merge to deal with simultaneous constraints point to fertile spaces where a new form of innovation occurs – one occasionally labeled by informants as frugal innovation. Whatever you call it, this is a form of innovation that stems from hybrid mix of technology innovation to overcome resource constraints, institutional innovation to overcome institutional concerns and voids, and social innovation to

address challenges of scale and affordability. To reflect these interpretations I propose the following:

> ***Proposition 4:*** *A mix of technology, institutional, and social innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation.*
> ***Proposition 4a:*** *Social entrepreneurs combine technology, institutional, and social innovation as part of the process of dealing with resource constraints, institutional voids, and affordability constraints.*
> ***Proposition 4b:*** *Social entrepreneurs combine technology, institutional, and social innovation to assure the outcome of innovation is adaptable, accessible and affordable.*

In a nutshell, the definitions of frugal innovation that draw from the above propositions are one from an innovation process perspective and two from an innovation outcome perspective. The process and conceptual definition of frugal innovation is that it works with or around to overcome institutional voids, resource scarcity (such as constraints to business resources and scarce environmental resources), and affordability constraints (lack of purchasing power) to create more inclusive markets. The outcome and operational definition of frugal innovation is one that develops affordable, adaptable, & accessible solutions to serve underserved segments.

In the next section, I provide support for the above theoretical model of frugal innovation based on published accounts of innovation. A review of these published examples help to test applicability and relevance of the theoretical model to cases beyond the ones from which it was drawn.

6.4 Applicability of models and theory to secondary case examples

Thus far I developed theory based on my empirical data and in this section I attempt to investigate if the theory applies to popularly published accounts of social entrepreneurship. As far as was possible for me as a researcher, knowledge of the following cases did not influence the development of the above theory. Towards a preliminary test of the applicability of the findings, models and theory proposed in this study, I reviewed ten frequently cited cases of innovation for underserved markets. Recall that underserved markets were a main cross cutting theme divulged by the social entrepreneurs in this study (chapter 4). I categorized the ten cases along the dimensions of the two models of innovation revealed in chapters 4 and 5. Recall model 1 was for innovation in general while model 2 was for innovation under constraints.

Table 6.2 shows the positioning of the cases as per their relevance to the social, efficiency, challenge or user based innovations in model of innovation 1 and as per the corresponding relevance to the overlapping space(s) of technology, social, and institutional innovations in model of innovation 2. I find support in these popular cases for all the dimensions in the two models. This table also helps to show the complementary nature of the two models whereby cases can be categorized using both models together. I next describe how these published cases can be deemed as exemplary cases of frugal innovation.

<See table 6.2, page 311>

6.4.1 Intersection of technology and social innovation

In the next five cases I describe how each fits in one of the four quadrants of model of innovation 1 with examples reflecting social, efficiency, and challenge based innovations. I then describe how they fit in the overlapping region of technology and social innovation of model of innovation 2. I also suggest how with reference to proposition 1, the cases show that a mix of technology and social innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation. The processes involve using technology innovation to deal with resource constraints and using social innovation to deal with affordability constraints. The outcomes of these processes are meant to lead to frugal innovation that is adaptable and affordable.

i) Aravind eye care system (social based)

Since 1976 Aravind Eye Hospital has been on a mission to end blindness in India seeing 2.5 million patients a year (Mehta and Shenoy 2011). Today Aravind is the largest eye surgery provider in the world. Amongst its highly touted technical and social achievements are dropping the imported price of intraocular lenses from $200 a piece to locally produced $5 a piece, costs $10 to conduct a cataract operation that lasts just 20 minutes, 300K eye surgeries a year, and gross margin of 40% despite that 70% of patients receive free or heavily subsidized rates. With less than 1% of the country's ophthalmic manpower, Aravind accounts for 5% of the ophthalmic surgeries performed nationwide (Aravind 2011). The hospital network uses broadband for rural screenings. "We are going from village to village to provide eye care to the unreached," says Aravind's chairman, Dr. P. Namperumalsamy (Rubin 2007, online).

By comparison the average cost for this eye procedure in the US is about $1,650. The key to these achievements have been constantly cutting costs, increasing efficiency, and building market base. The high scale and high efficiency is enabled through a Fordist assembly process: "Doctors have created equipment that allows a surgeon to perform one 10- to 20-minute operation, then swivel around to work on the next patient -- who is already in the room, prepped, ready, and waiting. Post-op patients are wheeled out, and new patients are wheeled in." (Rubin 2007, online). The hospital's Aurolab pioneered the production of high-quality, $5 low-cost intraocular lenses producing 700,000 lenses a year, of which three quarter are exported all over the world. However, the lenses are not exported to the US since Aravind cannot afford the costly US-FDA clinical approval process (Rubin 2007).

Aravind's social mission is to provide "sight for all and to see everyone as one", which embodies creation of value for inclusive markets. The guiding principle is to achieve wide scale social improvement of common sight problems through affordable eye surgery and not to turn away any patient, poor or rich who knocks at Aravind's door. Technology outcome is of adaptable solutions to the Indian context where resources and skills are lacking and this is accomplished through redesign of products and services and reconfiguration of the surgery value chain. The outcome of these social and technical processes is a frugally innovative eye care service that is widely accessible and highly affordable to everyone.

ii) General Electric's ECG and ultrasound machines (efficiency based)

It may not be conventional to identify or label a multinational corporation as a social entrepreneur, but I refer to GE, and later to Tata corporation as such because of the focus of some of their specific projects targeted at resolving problems of underserved consumers. I note also that some of the social entrepreneurs I interviewed referred to both GE and Tata in

explaining their conceptions of innovation and in particular of frugal innovation, so there is some evidence that this usage is accepted among social entrepreneurs themselves.

In a case study on "How GE is disrupting itself" by GE chairman Jeff Immelt, Govindarajan, and Trimble (2009) say, "If GE doesn't master reverse innovation, the emerging giants could destroy the company." The authors offer that the long pursued glocalization strategy of innovating in developed markets and distributing to the rest of the world with some adaptations to local conditions has to pave the way for a reverse innovation strategy. Glocalization limited GE to skimming the top of emerging market opportunities by focusing only on the high paying wealthy segment. In the latter, solutions are designed and developed for the broader markets in emerging economies, such as the $1K handheld electro-cardiogram machine and the portable ultrasound device (which costs 15% of GE's contemporary ultrasounds), and are finding their way to new applications in the United States. Another example is a low cost baby warmer developed for Nepal by Embrace, a startup stemming from research site B in Stanford, which is being sought by GE for use in the cold regions of the US. Organizationally it means that the centralized and product focused structure has to change to a more decentralized and local market focus structure.

Given the threat by low cost competitors from emerging markets, GE is driven both by the pursuit of efficiency for cost leadership as well as the prospect of new mass markets in developing countries. Immelt et al show in the case of GE, how reverse innovation products are creating new markets in both the emerging and developed world by offering two main differentiators, dramatically lower price-performance points and search for new applications.

For GE, the guiding principle is to achieve large market capture through efficiency improvement of solutions for problems in developing markets. But problems in these markets often include affordability constraints which have to be dealt with in order to resolve those problems and thereby improve social conditions through more affordable solutions. In the cases of the ECG, ultrasound, and baby warmer technologies, the technology outcome involves designing adaptable solutions to the Indian context where resources and skills are lacking and this is accomplished through redesign of products and services and reconfiguration of manufacturing and distribution value chains. The outcome is frugal innovation in healthcare technologies that is affordable and adaptable to the Indian context.

iii) Tata Nano (challenge based)

The reality in India for instance, is that it is not uncommon to see a family of five riding on a single Vespa scooter. While MNCs such as Mercedes and BMW tap the luxury market, Ratan Tata, entrepreneur and CEO of the TATA conglomerate looked at this unsafe, yet very common practice of transportation and commented:

> "*I observed families riding on two-wheelers - the father driving the scooter, his young kid standing in front of him, his wife seated behind him holding a little baby...It led me to wonder whether one could conceive of a safe, affordable, all-weather form of transport for such a family. Tata Motors' engineers and designers gave their all for about four years to realise this goal. Today, we indeed have a People's Car, which is affordable and yet built to meet safety requirements and emission norms, to be fuel efficient and low on emissions*." (Foster and Malhotra 2008, online)

The result of this challenge that Ratan Tata gave to his motoring division was the $2K Tata Nano car targeted at those on scooters who can now make what was once considered an impossible leap to car ownership. The Tata Nano is the least expensive car in the world being

sold in India as well as neighboring countries such as Sri Lanka. A European version built on the Nano platform called the Pixel was showcased in Coventry, UK with innovations such as all four wheels that turn ninety degrees to facilitate parking.

For Tata Motors, the guiding principle was to meet the technical challenge of producing a car for the masses at a price that was inconceivable in the industry. The price of the car was paramount given the inability of masses of people in India to afford a car, an example of an affordability constraint. What made the car socially affordable was technology innovation that used processes, tools, and resources to redesign the car as well as reconfigure the value chain away from the traditional assembly and distribution network. Prahalad and Mashelkar (2010) point that strict parameters-about price, safety and environmental standards, space, and design formed the Nano's "innovation sandbox" (Prahalad 2006). The traditional manufacturer assembly to dealer distribution value chain was rethought by assembling the car in a modular fashion and shipping it half completed to local mechanics that would both assemble and sell the vehicle in their local and often rural contexts. The outcome is a frugally innovative car that is affordable and adapted to the Indian context.

iv) Space X (challenge based)

The Ansari X-Prize announced in 1996 offered $10 million in prize money for the first non-government organization to launch into space a reusable manned spacecraft twice within two weeks. A typical space shuttle mission costs on average $450 million (JFK Space Center 2000) and a space tourism ticket about $20 million on the Russian Soyuz, both of which are far beyond the reach of mainstream civilians. The prize hoped competition would breed innovation in new low-cost methods for space exploration. It aimed to demonstrate that

spaceflight can be affordable and accessible to not just the government but also corporations and more importantly civilians.

The technical design criteria were reusability, reliability, simplicity and low cost. Mojave Aerospace Ventures and Scaled Composites won the prize in 2004. Today a civilian space launch, such as that by Virgin Galactic charges $200,000 per ticket for a space flight which when compared with the $20 million charged by the Russian Space Agency equates to a radical 99% cost reduction. Virgin Galactic's Spaceship 2 holds six passengers, the average cost of a single mission amounting to around $1.2 million (Virgin 2012). Compare this to NASA's $450 million and we experience a 99.7% cost reduction. This reduction in price and technical improvement reflects the constructs of "radically improve performance" and "design breakthroughs" that constitute challenge based innovation found in chapter 4.

Luciano Kay (2011) studied X prizes and found that teams focused on simple and low-cost solutions by using existing technologies, or the "make-do" construct. In fact, since prizes do not provide up-front funding for R&D and pose strict deadlines, low-cost solutions and faster achievement end up being the most important design and development criteria (Kay 2011). The downside however is that prizes cannot guarantee that entrants with the best ideas are motivated to participate or that the best idea is selected at the minimum cost (Scotchmer 2005). Again, by using technology innovation to do much more with fewer resources and social innovation by bringing space travel within the affordable reach of mainstream society, the outcome here is frugally innovative space travel that is affordable and adapted to the resource limited environment.

v) One laptop per child (challenge based)

I do not cover this case in detail as it is quite similar the previous two ones. However this is a very popular case of the One-Laptop per Child project initiated by Nicholas Negroponte of the MIT Media Lab. The project challenge was to design a laptop for the world's school children and offer it to them at an affordable price of $100 a piece. The case can be positioned in the overlapping space of technology and social innovation and hopes to achieve an outcome of frugally innovative laptop that is adaptable and affordable. Although the OLPC itself has not been very successful in achieving that goal, it did initiate the challenge and exhibited a proof of concept by instituting technical breakthroughs and radical improvement in price-performance. Recently however, Google had begun to offer their laptop at $100 a piece, something OLPC has been unable to achieve.

6.4.2 Intersection of institutional and social innovation

In the next two cases I suggest how each fits in to one of the four quadrants of model of innovation 1 with the first example reflecting social –based innovation and the second reflecting user-based innovation. I also describe how they fit in the overlapping region of institutional and social innovation of model of innovation 2. With reference to proposition 2, the cases show that a mix of institutional and social innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation. The processes involve using institutional innovation to deal with institutional voids and using social innovation to deal with affordability constraints. The outcomes of these processes are meant to lead to frugal innovation that is accessible and affordable.

vi) Grameen Bank (social based)

Microfinance has been revolutionary in not only how it has affected people and communities on the ground, but also in raising awareness of the needs of the poor. This awareness was brought into mainstream with the award of the Nobel Peace prize to both Grameen Bank as well its founder Professor Muhummad Yunus in 2006 "*for their efforts to create economic and social development from below*" (Nobel Prize 2006, online). The microfinance phenomenon has provided access to financial resource lending to people who have otherwise been traditionally excluded from the mainstream banking sector due to lack of access constituting institutional voids as well as unavailability of collateral constituting affordability constraints.

The primary social objective of Muhummad Yunus was to overcome this access to capital, which he deemed was necessary to help improve the social wellbeing of underserved, rural, or deprived communities. Microfinance extends inclusiveness to all groups, particularly poor women in developing countries, to whom access to finance was considered inconceivable two or three decades ago. The popularity of microfinance has gained traction as a social movement to help eradicate poverty. The enabling institutional innovation that deals with the institutional voids of collateral, risk assessment, and recovery mechanisms lies in lending not to individuals, but to community groups constituting mainly women. Every person in the group essentially insures each other and the collective dynamics help to ensure that there is pressure to perform and repay loans on the whole group. The outcome of these social and institutional processes is a new market for microfinance, which can be considered a frugal innovation which makes capital accessible and affordable to virtually everyone.

vii) Mumbai Dabbawallas (user based)

Professor Karl Moore (2011) of McGill University and fellow of Green Templeton College, Oxford narrates how the dabbawalas of Mumbai exemplify frugal innovation as a process of maximizing the efficiency of the supply chain in order to meet personal user requirements. A network of lunchbox carriers, known as dabbawalas, who work independently have formulated a means and a system by which their job to deliver lunch meals on time is achieved with unmatched efficiency. The system is efficient at a rate of only 1 error out of 16 million transactions. Forbes Magazine awarded Six Sigma certification in 2001 to the dabbawalas.

Although the business model is simple -- delivering freshly cooked home meals in lunch boxes to family members at work and school -- the delivery process is anything but simple. Five thousand dabbawalas deliver more than 200,000 lunch boxes every day using a complex supply chain that comprising collection, sorting, and delivery zones, trains, bicycles, and communication through manual codes. Since most of the dabbawalas are illiterate, only numbers and colors are used for the coding system. Over time however, the dabbawalas have now innovated further by adopting website and mobile text messaging for receiving requests for deliveries.

Moore holds that sometimes less is indeed more. The dabbawalas use little literary skills, almost no fuel, no capital investment, almost no modern logistical technology, and yet offer a high quality of service which Moore terms as "frugality at its best." Further, the operating context matters immensely to frugal innovation. The dabbawalas are extremely successful in Mumbai for decades but have not expanded to other cities – a finding I argued in chapter 4 for user-based innovation. Moore believes a reason for this that the system is

built on a combination of characteristics involving, codes, proximity, density, train network, bicycles, and others that are unique to the city of Mumbai. The dabbawalas have innovated to fulfil their own user needs to transport tins to the right place on time. Often, user based innovations are so idiosyncratically specific to the user and context, that it is difficult to replicate or scale these up to other users and contexts.

Socially, the Mumbai dabbawallas make for themselves a living and livelihood whose long term sustainability is ensured by the efficient and cost-effective delivery of home-made lunches to 200 thousand people in Mumbai. Institutionally, the dabbawallas are able to do this through a system that both overcomes and taps the complexity of crude and dilapidated infrastructure in Mumbai as well as their own inability to read and write. The outcome of these social and institutional processes is a frugally innovative transportation system for lunch boxes that is highly efficient, making the delivery of tins possible, accessible and affordable to virtually everyone in Mumbai.

6.4.3 Intersection of technology and institutional innovation

In the next case of mobile phone banking, I describe how this case can be considered primarily as efficiency based to fit in the model of innovation 1. I also describe how it fits in the overlapping region of technology and institutional innovation of model of innovation 2. With reference to proposition 3, this case shows that a mix of technology and institutional innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation. The processes involve using technology innovation to deal with resource constraints and using institutional innovation to deal with institutional voids. The outcomes of these processes are meant to lead to frugal innovation that is adaptable and accessible.

viii) Mobile phone banking (efficiency based)

Colin Mayer (2011: video) says "*a revolution is taking place in finance, it is a revolution that is not happening in the streets of New York or London or New York, but in the slums of Kenya (through) what is termed mobile banking*". The role of new mobile phone technologies and its impressive affordability and wide scale availability in even the most remote parts of Africa and Asia provides a technical means to formulate and deliver banking services. Using this mobile platform, several multinational mobile firms are entering the banking sphere, to provide banking services more efficiently, effectively and in a more affordable manner than the traditional brick and banking sector. In the four years since 2007 that M-Pesa has been operating, about 14 million Kenyans or 70% of the adult population have been brought into the banking sector (Daily Nation 2011). According to the International Monetary Fund, in October 2011 M-Pesa conducted more transactions domestically within Kenya than Western Union does globally. The project began in 2003 as an initiative of the UK development agency, DFID, with Vodaphone. In Pakistan, where only 12% of the 170 million population is served by the formal banking system (Sambandaraska 2010). Here two local organizations, including Telenor (a leading mobile phone operator) and Tameer (a local microfinance Bank) created a joint venture to offer banking to virtually every adult which is accessible throughout the country, known as 'EasyPaisa' (or EasyCent) service. Telenor and the State Bank of Pakistan sought to help the billions in developing countries break out of the cycle of poverty by providing low-cost, convenient financial services.

But the role of legal systems, or lack of such which resemble institutional voids, is also crucial in understanding the socio-political process of operationalizing such novel financial platforms. Mayer believes one reason why M-Pesa has particularly taken off in

Kenya depends on how the regulatory authorities have responded. Conventional banks do not like mobile phone transactions since theybypass the banking system. Although there have been calls for mobile banking to be regulated as a bank, Kenyan authorities have resisted. "*If it is regulated like a bank and goes through the banking system it's very expensive. If it's kept outside of the banking system and just involves mobile phone transactions, it's incredibly cheap*" (Mayer 2011: video).

With Pakistan introducing in March 2008 some of the first regulations in the world for branchless banking and now eleven competitors in the pipeline, it is termed a 'laboratory for innovation' for this emerging sector (Bold 2011), not only in terms of technology innovation but more importantly perhaps in terms of institutional innovation. State Bank of Pakistan regulations have helped to implement a bank-led sustainable and profitable 'branchless banking' model that prioritizes services for low income consumers in rural areas (Bold 2011), something Bhatti, Khilji, and Basu (2013) describe as a 'lowcal' strategy, short for low cost and local.

This form of banking which bypasses the banking system may be worrisome for regulatory authorities in Western countries for money laundering concerns. In contrast, mobile phone banking can provide transparency on all transactions, creates trust, and so stymies money laundering. Not only does mobile phone banking provide a means for instantaneous transactions, but can afford transparency and help build trust in the society. In contrast, in the developed world trust has been eroding in the developed world's financial markets. Additionally the technology could leapfrog existing legacy based banking solutions in the developed world:

"What could happen in the developing countries is that this form of technology could leapfrog ahead of existing monetary payment systems that we have. So instead of spending three or four days clearing a check, as typically happens in this country (the UK), one has a mechanism for instantaneous transmission of money. One of the reasons why its been so successful in Kenya, is that people can observe straight away whats happening to their money...you instantaneously can see on your phone that you've been credited for the money you handed over. So it creates trust and trust in financial markets is absolutely critical." (Mayer 2011: video)

On comparing microfinance with mobile banking, Mayer believes mobile banking will be even more exciting than microfinance for social improvement, discussed earlier, because instead of placing emphasis on borrowing and people getting into debt, mobile banking can help people accumulate savings: *"And that (savings culture) I think in the long term is actually going to be more transformational than the emphasis on lending through microfinance which has been featured so prominently to date."* (Mayer 2011: video). Even Adam Smith (1904) proffered long ago that frugalness is important for accumulating savings and generating capital for investment.

We notice from this case that a combination of technology innovation and institutional innovation is employed to deal with resource constraints such as lack of savings and lending to poor communities and deal with soft institutional voids such as mobile banking regulatory mechanisms as well as hard institutional voids such as lack of brick and mortar bank branches in developing countries. The outcomes of these processes mean that mobile phone banking as a frugal innovation is adaptable to specific contexts yet accessible to mainstream society.

6.4.4 The technology-social-institutional nexus

In the next two cases I suggest how each fits in to one of the four quadrants of model of innovation 1. I also describe how they fit in the overlapping region of technology, institutional and social innovation of model of innovation 2. The first case fits mainly within social-based innovation and the second case within challenge-based innovation. With reference to proposition 4, this case shows that a mix of technology, institutional, and social innovation creates a hybrid form of innovation marked by distinctly different processes and outcomes, exemplified by frugal innovation. The processes involve using technology innovation to deal with resource constraints, using institutional innovation to deal with institutional voids, and using social innovation to deal with affordability constraints. The outcomes of these processes are meant to lead to innovations that are adaptable, accessible, and affordable.

ix) **Narayana Hrudayalaya cardiac hospital (social based)**

Dr. Devi Shetty was Mother Teresa's cardiac surgeon and was dubbed the "Henry Ford of Heart Surgery" by the Wall Street Journal (Anand 2009). Shetty applies process innovation and economies of scale to increase efficiency and drive costs down for cutting-edge medical care in India that benefits society at large, for all social classes. His flagship heart hospital, Narayana Hrudayalaya Hospital (NHH) in Bangalore, has 1000 beds, charges $2,000 for open-heart surgery, performs 600 operations a week, and carried out 3,174 complicated cardiac bypass surgeries in 2008. Compare these to the average hospital size in the US of 160 beds, $20K to $100K charge for heart surgery, and the 1,367 cardiac bypass surgeries in 2008 for US leader The Cleveland Clinic. Shetty's hospital has operated on 2,777 pediatric patients which is more than double the 1,026 surgeries performed at Boston's

Children Hospital. And it’s not just numerous procedures, rather the success rate are just as good as those in developed countries. Shetty says, "Japanese companies reinvented the process of making cars. That's what we're doing in health care." (Anand 2009, para 6). Towards scaling this model, Shetty's group has expanded to a 1,400 bed cancer and 300 bed eye hospital in his homeland. But he has also expanded internationally by setting up in the Cayman Islands to serve Americans in search of lower-cost medical care.

But although most published references to NHH tout the efficiency of its healthcare, the primary motive and objective of Dr Shetty, much like Dr Venkataswamy’s Aravind hospital, is to reduce inequity in healthcare services for the poor towards achieving social improvement. About one third of the NH hospital's patients receive almost free healthcare. At just an insurance premium of $3 a year per person, through a farmer's insurance plan Shetty formulated with the state authorities, the NHH enables health insurance to be adaptable to the needs of the context and people within it. Through this insurance plan, NHH provides services not as a handout, but as an empowered and affordable right through affordable health insurance. Dr Shetty not only institutes technology innovation in the surgical procedures and processes he helps to improve, but also employs institutional innovation such as co-opting the insurance providers to cover non-traditional customers, mainly poor patients. Where necessary, poor patients are subsidized through higher margins from wealthier patients and like Aravind, few if any are turned back from receiving world class healthcare. What sets NHH apart from Aravind is the cooptation of insurance industry into its business model. The outcome of this complicated mix of technology, social, and institutional innovation is the ability to afford a frugal innovation healthcare system that is affordable, adaptable, and accessible to all, rich and poor.

x) $300 House (challenge based)

The 300 dollar house was proposed in 2011 as a design challenge by Govindarajan, a Professor of innovation and strategy at Dartmouth College and Christian Sarkar, an innovation and strategy consultant. Initially, they put it out as an idea on the HBR blog, but it quickly gained global traction among various individuals and companies representing different sectors to come up with a viable solution for the world's housing problem. Because so many different actors have come together to take on the challenge to come up with a $300 home for the world's homeless, it is difficult to analyze the main reason for them to do so. For instance, individuals may be partaking in the project to resolve what they see as personal needs, designers and engineers may be motivated by the prospect of challenging design criteria, companies may be doing so to come up with and test efficient designs, and others could be doing it as a social cause that resolves a major human need. But overall I place it within challenge based innovation as it is called exactly that by the initiators, a prize driven design challenge and because it is meant to reveal a proof of concept, a construct divulged in chapter 4.

In terms of the model of innovation 2, the project is perhaps more inter-disciplinary and complicated than any of the other examples cited thus far. The initiators of the challenge describe the involvement of various actors as:

> *"By helping create this ecosystem, we believe companies can make money while providing services needed by the poor at an affordable cost. The poor deserve a chance, a real chance, to make it out of poverty. To do this, we'll bring together people, institutions, and businesses in a "creation space" to:*
>
> *1) turn this idea a reality, and*
>
> *2) test it out in the field." (300 house,*http://www.300house.com/concept.html*)*

The 300 house considers not only the technical challenge of design, construction, and manufacture under resource constraints but also the associated challenges of housing such as social improvement for those it is designed for, and also of institutional challenges of leasing or buying land and distributing the homes to far flung corners of the world. Different actors have come up with varying proposals on how a mix of technology, social, and institutional innovation can deal with the mix of resource constraints, affordability constraints, and institutional voids associated with housing. The outcomes of these processes are meant to lead to a frugal innovation house that is adaptable, accessible, and affordable.

Having shown in this section the likelihood of application of the models of innovation and theory proposed in this study to better understand secondary cases, I believe there is adequate reason to assume that the models and theory generated in this study can be useful for gaining greater insights into innovation as conceptualized by social entrepreneurs and for the possibility of recognizing an emerging concept of frugal innovation. In the next section, I show how the understanding of frugal innovation from this study compares with the term as it is discussed in existing literature as well as of similar terms and notions in existing literature. Specifically, I outline how the theory and definitions of frugal innovation based on the conceptualization of this study's empirical base of social entrepreneurs, differs from frugal innovation found in existing literature as well as from related terms reverse innovation (starts with innovating for developing markets), grassroots innovation (locally focused), inclusive innovation (limited to underserved markets), and *jugaad* innovation (indicates more DIY or bricolage).

6.5 Frugal Innovation and related concepts in literature

Having introduced the concept of frugal innovation based on the models of innovation sourced from empirical data on social entrepreneurs' perceptions, I now look at how frugal innovation is discussed in existing literature and outline related terms also found in the literature. I discuss the different types of emerging concepts in innovation such as reverse innovation, grassroots innovation, inclusive innovation, and *jugaad* .

The first global scholarly debut of frugal innovation was in a 2010 special report by the Economist magazine. It described frugal innovation as "not just a matter of exploiting cheap labour (though cheap labour helps), it is a matter of redesigning products and processes to cut out unnecessary costs" (Woolridge 2010, online).[16] The first global practical debut of frugal innovation, based on the author's knowledge, was the establishment in 2009 of the "Frugal Innovation Lab" at Santa Clara University by serial entrepreneur Radha Basu. Sometimes frugal innovation is also referred to as reverse, jugaad, or shanzhai innovation (Wooldridge 2010). So as a relatively novel concept, widespread agreement on how frugal innovation is defined and demarcated from other forms of innovation is still yet to be achieved. Prevailing concepts that have been popular in the literature for significantly longer, such as social entrepreneurship (Zahra et al 2009) and business models (George and Bock 2011), have yet to settle on a single definition. Even Radha's perception of and use of frugal innovation in practice has evolved from five core competencies needed in innovation for the developing world to eight and now expanded to ten core competencies (c.f.

[16] Before The Economist special report, a brief article in newspaper outlet Business Standard magazine (31 July 2009) by Bhandari on "Frugal Innovation" describes General Electric's technology centre in Bangalore a "low-cost but cutting-edge facility". According to another news article, frugal innovation integrates specific needs of the bottom of the pyramid markets as a starting point and works backward to develop appropriate solutions which may be significantly different from existing solutions designed to address needs of upmarket segments (Silicon India 2010).

Basu, Banerjee, and Sweeney 2013). Increasingly though, it is a concept that is gaining popularity in both practitioner and academic circles (c.f. Woolridge 2010; Crabtree 2012; Tiwari and Herstatt 2012; Bhatti 2012; Bhatti and Ventresca 2012; 2013; Bhatti, Khilji, and Basu 2013).

This research and the findings of variant approaches to innovation among social entrepreneurs suggests that some of the terminological confusion comes from the shifting focus in the way people think about innovation from artefact, value chain, mind-set, to impact whereas some of the confusion comes from shifts in the course of innovation as a process that ranges in technology, institutional, or social aspects. Strategies include redesigning products (Zeschky et al 2011), reconfiguring value chains (Sharma and Iyer 2012), or rebuilding entire ecosystems (Bound and Thornton 2012). In essence frugal innovation is a label that captures a range of heterogeneous activities which cut across different sectors. For this reason perhaps, four other concepts that are sometimes also labelled as frugal innovation include reverse innovation, grassroots innovation, inclusive innovation, and *jugaad*.

A bibliometric search of Google Scholar was made on related concepts since 1990 and the findings are presented in figure 6.4. Google Scholar was used for the search given its growing popularity in revealing scholarly literature comprising peer-reviewed papers, theses, books, preprints, abstracts as well as technical reports from practitioners and policy makers representing broad areas of research. Additionally, Google Scholar has the ability to extract references in several languages. Concepts which resulted in less than twenty publications since 1990 are not shown in the plots as they were deemed not popularly significant enough. We see the five top terms are *reverse innovation, grassroots innovation, frugal innovation,*

inclusive innovation, and jugaad. Although there are others, I focus on describing and critically discussing these four variants sometimes posed or confused as frugal innovation.

<See figure 6.4, page 305>

6.5.1 Reverse innovation

Reverse innovation is defined as “any innovation that is adopted first in the developing world” (Govindarajan and Trimble 2012, p.4). Reverse innovation follows from an understanding of how innovation in developing versus developed markets differs (c.f. Van Agtmael 2007). In developing an evolutionary model of reverse innovation, Govindarajan and Ramamurti (2011) propose that “competitive advantage is likely to shift from emerging MNEs (multinational enterprises) to developed world MNEs as the onus shifts from developing products to marketing them globally” (Sarkar 2011, p.239). Woolridge cited earlier as having first debuted frugal innovation in mainstream practitioner outlets, supports reverse innovation by writing "Frugal innovation radically redesigns products and services to make them much cheaper for the emerging middle class -- and then re-exports them to the West" (2011, p. 6). Govindarajan and Ramamurti discuss implications of reverse innovation for global strategy as well as organizational design of multinational enterprises.

In chapter 4 and specifically model 1, I referred to efficiency based innovation as being supported by literature on reverse innovation. This was because in reverse innovation, Western commercial firms are seeking to become more efficient and productive from 'frugal' practices and opportunities in developing and emerging markets. These lessons are then sought to be transported back to their home markets to become more competitive. A respondent from research site A mentioned reverse innovation as:

> *"We have already been laggards in mobile banking because we have alternative well developed infrastructure here. But we will need to catch up and start designing and developing and investing in developing economies to bring back solutions that could be useful for ourselves." (27I)*

In shifting market focus from developed markets to emerging markets, Govindarajan and Trimble (2012) signal five needs gaps as starting points for revising innovation strategies through reverse innovation: performance gap, infrastructure gap, sustainability gap, regulatory gap, and preferences gap. From an analysis into the constraints of resource scarcity and institutional voids faced by social entrepreneurs without regard to functioning in developing or developed markets, my research both corroborates and expands Govindarajan and Trimble's five gaps. The first order codes from this study which relate to the five gaps are depicted in table 6.3. These comprise about half, or specifically 17 of the total 33 first order codes. . But while some of the constructs from my research support Govindarajan and Trimble's five gaps, the additional constructs suggest two new findings about the needs gaps.

<See table 6.3, page 311>

First, these gaps exist also in pockets of areas in developed markets, as my data reveals in chapters 4 and 5. This emanates partly from the fact that among the social entrepreneurs I studied there included those who function in either or both developing markets and developed markets. Second, while developing and developed market comparisons are useful, they are insufficient to provide an understanding of innovation under constraints. Constraints can be faced in either contexts, though perhaps in varying degrees. The question of innovation under the dual constraints of resource scarcity and institutional voids has to be studied without assuming that a study of developed or developing markets would account for constraints to innovation. Rather than viewing innovation from the lens of

strategy to study globalization, glocalization, or something else between developing and developed markets, we may view innovation from the lens of organization of innovation under constraints. This is why I believe the approach in this study to frugal innovation whichstems from a focus on understanding what is innovation among social entrepreneurs, is useful in moving away from the distinctive focus on developed and emerging markets as drivers of frugal or reverse innovation.

Indeed, many of the developing markets may experience more constraints to innovation than developed markets. And Govindarajan and Trimble's inspiration is drawn in part from constraints in developing markets such as performance and infrastructure gaps. But even within Govindarajan and Trimble's book on reverse innovation, the discussion of constraints as drivers of reverse innovation is secondary. The book does not cover constraints apart from acknowledging "In a situation free of constraints, and evolution toward complexity is almost inevitable" (p.127). While some of the cases the book cites such as corporations Deere, Harman, GE and social enterprise Aravind embody several features of constraints, other cases cited such as Pepsico, Partners in Health, P&G, EMC, and Logitech are not primarily driven by constraints (Bhatti 2013a). For this reason, I argue that frugal innovation better addresses innovation under constraints while reverse innovation addresses innovation strategies on where to innovate and where to diffuse the innovation between developing and developed markets. Thus my understanding from works on reverse innovation is that it encompasses a high level strategy of innovation sources and diffusion and does not deal with the 'how to' or the 'what is' innovation under constraints – frugal innovation covers this gap.

6.5.2 Grassroots innovation

Over the past two decades, most of the literature on grassroots innovation is rooted in sociology, anthropology and international development with focus on poverty alleviation and sustainable socio-economic development (c.f. Gupta 1998; Warren 1990; Monaghan 2009; Letty, Shezi and Mudhara 2012; Smith, Fressoli and Thomas 2014). More recent work in grassroots innovation has benefitted literature on information technology development (Bailey and Horvitz 2010; Hanna 2011) and governance (Gault et al 2012), among others such as transportation (Ross, Mitchell and May 2012).

Grassroots innovation draws its name from origins in marginalized, often rural (Agarwal 1983) communities or the informal sector (Cozzens and Sutz 2012). The idea is to make beneficiaries in to "agents, not patients" (p.2). Ross, Mitchell and May (2012) explain grassroots innovation as one that is triggered by individual users or communities when they try to come up with a solution to a personal or societal problem. More generally Monaghan cite the grassroots as an "alternative site for the development of innovations that may contribute to shifts towards more sustainable systems of consumption and production" (p. 1026). Seyfang and Smith (2007) use the term to describe "networks of activists and organisations generating novel bottom–up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved. In contrast to mainstream business greening, grassroots initiatives operate in civil society arenas and involve committed activists experimenting with social innovations as well as using greener technologies" (p.585).

So there are in grassroots innovation components of user-led (Von Hippel 1988) and need based (Jain and Verloop 2012). It is also frequently cross referenced with social

innovation (Butkevičiene 2008; Jain and Verloop 2012) as well as inclusive innovation (Letty et al 2012). For wider social change that is adopted by communities, efforts towards local development must involve the community to achieve innovation that is inclusive in its process as well as in its outcome. Therefore given some of the same contextual constraints as those faced by social entrepreneurs, grassroots innovators seek to adapt to scarcity based on traditional knowledge, skills and materials (Gupta 1998; Gupta et al 2003).

Seyfang and Smith's (2007) broad claim is that bottom up, community based innovations, are both social as well as technology related and that grassroots innovations are driven by two motives: social need and ideology that is more focussed on sustainable innovation as compared to rent-seeking commercial innovations. However, although grassroots innovations are useful in showing that alternative processes and outcomes are possible for sustainable development, they have been unable to take this mainstream due to disconnect or inability to diffuse up to mainstream socio-technical regimes (Monaghan 2009). In contrast, this study helps to shift the focus to a "middle ground" that tries to bridge this gap between prototyping and scaling up. The interpretation of model 1 in chapter 4 is that the prototyping aspect is the purview of user-based, grassroots innovation while the scaling up aspect is the purview of efficiency-based, commercial innovation.

6.5.3 Inclusive innovation

Inclusive innovation is defined as "the development and implementation of new ideas which aspire to create opportunities that enhance social and economic wellbeing for disenfranchised members of society" (George, McGahan and Prabhu 2012, p. 663). Inclusive innovation according to Nijhof, Fisscher and Looise (2002) refers to the "inclusion of fundamental social responsibilities in both strategy and operations management in

organizations" (p.84). Nijhof et al's project on "inclusive innovation" seeks to develop a label for the integration of social responsibility and universal human rights within organizations. More recently though, the term has been used to denote "inclusive innovation" systems that take into account context-specific issues, obstacles and needs in developing countries such as underserved low income markets and informal institutions (Altenburg 2009), and to better address the needs of the poor by lowering costs of goods and service, or creating income earning opportunities for the poor, and by improving knowledge creation and absorption effects most relevant for the poor (Dutz 2007). George et al (2012, p.662) warn that "The field is in a state of infancy – particularly with regard to theory that deals satisfactorily with inequality and with the implications of inequality for innovation." But overall, inclusive innovation is about fostering growth and equality for underserved or disenfranchised people – though the means by which this is done or achieved is unclear (George et al 2012). Like reverse innovation, inclusive innovation tells us much about what should be done but not how to do it or in what form. To support this argument, Bound & Thornton (2012) posit that while inclusive is more focused on equity, frugal innovation instead "ultimately offers a way to resolve the tension between excellence and equity" (p.23).

6.5.4 *Jugaad* innovation

Jugaad innovation covers more ground than reverse innovation in how to do the innovation or what it should look like, but still is unable to answer several fundamental questions on means and ends. *Jugaad* innovation is defined as "an innovative fix; an improvised solution born from ingenuity and cleverness" (Radjou, Prabhu, and Ahuja 2012, p.4). The capability of doing more with less is covered but it is looked at as a high level art, culture or mindset, rather than a process or outcome, or means and ends. It is simply a culture and mindset of creative improvisation required for frugal innovation (Bound and Thornton

2012). According to proponents Radjou et al (2012), six principles of *jugaad* include frugal, flexible, simple, intuition, opportunity in adversity and include the margin. But Jugaad's fundamental principles are synonymous with the third construct of bricolage of 'improvisation' which is adaptation of working and creative thinking in order to counteract environmental limitations (Miner, Bassoff and Moorman 2001; Weick 1993b). In general it is described as an unstructured process or mindset that embodies making do to come up with an innovative fix.

Jugaad has its share of critics: "However, the term "jugaad" has the connotation of compromising on quality" (Prahalad and Mashelkar 2010, p. 2). CEO of Mahindra & Mahindra, Anand Mahindra says "We have to move beyond *jugaad*, frugal engineering and frugal innovation is fine, but not jugaad. The age of jugaad is over, we have to do more for less and that is what Mahindra Research Valley will embody. It is not about bridging the gap, it is a new paradigm, which is Indian" (John and Thakkar 2012). The danger in *jugaad* is that it can be viewed as a 'quick and temporary fix'.

Among the above four variants, the most commonly confused concepts with frugal innovation are reverse innovation and *jugaad.* But reverse innovation is more concerned about the strategy of learning from developing markets and taking those applications to identify new market segments or become more efficient in home markets. *Jugaad* lacks adequate empirical research to back its claims (Bhatti 2013b), which are at best an over limited conceptualization of frugal innovation often denoting bricolage or "making do". Frugal innovation in contrast, embodies *jugaad* as only one of many elements or dimensions.

Before moving on, I acknowledge there are other terms which could be argued to also relate to frugal innovation. Prahalad (2005) refers to "BOP innovation"; Christensen et al (2006) refer to "catalytic innovation"; Ray and Ray (2010) refer to "resource-constrained innovations"; Zeng and Williamson (2010) refer to "cost innovations"; and Prahalad and Mashelkar (2010) refer to "Ghandian innovation". Largely what is common across these is that these innovations are posed as outcomes that are low-cost, simple yet useful services for people whom traditional social sector organizations ignore. However, these terms haven't really picked up in mainstream practitioner or academic literature while the aforementioned have diffused more widely.

6.5.5 Frugal innovation

How does this study's conceptualization of frugal innovation similar or different from the above abstractions and to those found in existing literature?

The definitions of frugal innovation prevalently found in existing literature are governed by concerns for low cost and sourcing from developing or emerging market countries. In consulting literature, Ernst and Young (2011) define frugal innovation as the economical use of resources to provide products affordable to those on a lower income. In academic literature, scholars call frugal innovation as simply "toned down" and "good enough products" (c.f. Hang et al 2010), or low cost products (Govindarajan and Ramamurti 2013; Hesseldahl 2013). Definitions by Gupta and Wang (2009), Zeschky et al (2011), Tiwari and Herstatt (2012) and George et al (2012) seem familiar to those found in Govindarajan and Trimble's work on reverse innovation.[17]

[17] As a variant of frugal innovation, Carlos Ghosn, CEO of Nissan and Renault, uses the term "frugal engineering" to denote low cost input innovation. He says "Frugal engineering is

In a 2009 book titled “Getting China and India right: strategies for leveraging the world's fastest-growing economies for global advantage”, Gupta and Wang (2009) write, “By frugal innovation, we mean innovation that strives to create products, services, processes, and business models that are frugal on three counts: frugal use of raw materials, frugal impact on the environment, and extremely low cost.” (p.214). They stress that this type of innovation is in deep contrast with products, services, and processes which are typically energy inefficient, raw material inefficient, and environmentally inefficient, often produced in the advanced developed economies. Zeschky et al’s (2011) focus is on how Western companies are organizing their frugal innovation activities in emerging markets. Zeschky et al (2011) define frugal innovations as those that respond to severe resource constraints with products having extreme cost advantages compared to existing solutions. They compare such products with Christensen's concept of low-end disruptive innovation (1997) since products from frugal innovation are initially inferior to existing solutions given limited functionality and simpler, cheaper materials. Consequently they make little conceptual distinction on how frugal innovation is fundamentally different from disruptive innovation. George et al (2012, p.1) define frugal innovation as "innovative, low-cost and high-quality products and business models originating in developing countries and exportable to other developing countries or even the developed world". Tiwari and Herstatt (2012, p.97) define frugal innovations “as new or significantly improved products (both goods and services), processes, or marketing and organizational methods that seek to minimize the use of material and financial resources in the complete value chain (development, manufacturing, distribution, consumption, and disposal) with the objective of reducing the cost of ownership while fulfilling or exceeding

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achieving more with fewer resources. The cost of developing a product in the West is high since engineers there use more expensive tools. In India, they achieve a lot more with fewer resources.” (Nair 2008). Athreye and Kapur (2009, p.214) contend, “some firms from India and China have acquired a niche in "frugal engineering"—the ability to manufacture low cost versions of goods for mass markets.”

certain pre-defined criteria of acceptable quality standards". Tiwari and Herstatt's (2012) work has largely been on India serving as a lead market for frugal innovations, concerns similar to those of reverse innovation. And like Zeschky et al, they focus on frugal innovations as low cost and disruptive innovations without clarifying any distinction.

Fundamentally all four popularly confusing terms with frugal innovation, reverse, grassroots, inclusive, and jugaad, differ in that reverse innovation is international strategy driven (innovate in developing markets and diffuse that learning to developed markets), grassroots innovation is bottom up source driven (community initiatives rather than commercial or firm based), jugaad is process driven (a mindset that obstacles can be circumvented through creative use of what is on hand), and inclusive is outcome driven (the benefits should accrue to all levels of society). Some are set in contexts of market economy, others in the social economy. Some are motivated by profit (Schumpeterian rent) and others by social need or ideological pursuits. Some use the traditional organizational form of competitive firms, others use informal forms of associations or formal forms of hybrid organizations such as social enterprises, coops or networks. Some draw resources from commercial investment and profit generation, while others draw resources from grant funding, voluntary contributions and work, as well as profit generation. In chapter 4 I found diversity of perceptions in the range of economic orientations from non-profit to for-profit and in the nature of solution ranges from simply making do, good enough, to surpassing expectations and even striving for radical or breakthrough improvements.

Table 6.4 captures some of the above differences in terms of the dimensions outlined in model of innovation 2, specifically along the three constraints –institutional voids, affordability constraints and resource scarcity. The table depicts my analytical assessment of

how well each of the four prevailing innovation alternatives fare in either seeking to address or successfully addressing these three constraints. Reverse innovation's primary focus is on adapting solutions to resource scarcity in developing or emerging markets and may or may not address institutional voids and affordability constraints in the process (depending on which market segment is being targeted). Grassroots innovation's primary focus is on addressing affordability and resource scarcity and may or may not deal with institutional voids (depending on nature and degree of community or grassroots involvement). Inclusive innovation is similar to grassroots in this analytical assessment, and also supported by frequent cross referencing between the two in the literature. *Jugaad* innovation's primary focus is on affordability and resource scarcity and rarely, if at all, addresses institutional voids to make solutions more widely accessible.

In fact what this comparative table 6.4 highlights is that all alternative innovation constructs to frugal innovation do not fare well on either seeking to or successfully addressing widespread accessibility and scale up of innovations or considering in depth institutional innovation to do so. Frugal innovation, as shown in some of the cited examples in this study, seeks to, even if not yet fully successfully so, to address all three contextual constraints and does so by using a mix of social, institutional, and technology innovation to provide solutions that promise affordability, accessibility, and adaptablility.

<See table 6.4, page 312>

All four however are fundamentally similar in that they seek to demonstrate that an alternative way is possible beyond that currently embodied in mainstream innovation practices. Frugal innovation is also similar in that it seeks to exemplify alternative visions and practices. But it captures a range of differences highlighted by other constructs in the desire

for independent identity. Frugal innovation in this work, as opposed to existing superficial existing literature on this construct, instead provides a holistic, diverse and encompassing theoretical framework that captures both the similarities as well as the diversity in conceptions of frugal innovation.

In chapter 4, I used three lenses – the functional, process, and institutional lens to better understand the myriad perceptions of mixed / hybrid innovation as perceived by social entrepreneurs – something I called frugal innovation based on respondents' use of this term. Although the functional lens shows there are differences in the motivations and goals of frugal innovators, the process and institutional lenses show there are commonalities that bind all these notions of innovation around a set of ideas that can be identified together. Here I add another layer that should help operationalize frugal innovation. Figure 6.5 shows how we can propose definitions of frugal innovation at different levels of abstraction: From the high level abstract conceptual perspective to mid level theoretical perspective drawn from the theoretical conceptual framework outlined in chapter 2 moving on to more operational definitions drawn from empirical data in this study shown in chapters 4 and 5.

<See figure 6.5, page 306>

From an institutional perspective, frugal innovation is viewed as a purposeful systematic change on how development can be best achieved within specific social contexts. From the process perspective, frugal innovation is a set of activities to redesign products and services and reconfigure value chains to create value for inclusive markets. And moving even more so narrowly down to the functional perspective, a) in terms of social innovation, frugal innovation is ideational to achieve social improvement with aspiration for high scalability; b) in terms of efficiency-based innovation, frugal innovation seeks to achieve cost leadership as

a competitive advantage by generating high profits through low cost and high scalability; 4c) in terms of user innovation, frugal innovation solves personal needs of users by users with little or no aspiration to profit or scale from the innovation; 4d) and in terms of challenge-based innovation, frugal innovation is ideational on proving inclusive outreach by exhibiting proof of concept for a challenging concern.

The strength in this empirically embedded and analytical approach is that differences within frugal innovation are captured, i.e. it may mean to satisfy unmet needs (user based), become more efficient (efficiency based), solve social problems (social based), or solve wicked problems for the underserved (challenge based). But similarities that have become salient in this study help consolidate the construct despite these differences, i.e. how the four functional approaches recombine towards a common higher level approach and objective as shown in process and institutional definitions. However another operational definition may also help to capture similarities in the four functional perspectives.

The additional and simple operational definition of frugal innovation supported by findings in this study is defined by "means and ends to do more with less for many" (see table 6.5; Bhatti, Khilji, & Basu 2013). This definition encompasses a wide range of perspectives of its motivation, process, and outcome. The "means and ends" describes the component of innovation that can both be a process as well as an outcome to achieve affordability.[18] The "to do more with less" describes the notion of efficiency in process and outcome as well as use of bricolage to get more out of few resources in the contextually constraining environment and to achieve adaptability. The "for many" describes both the generation of economic and social

[18] See my earlier work Bhatti, Khilji, and Basu (2013) and also supported by think tank report by Bound and Thornton (2012), where frugal innovations can involve manufacturing and service delivery processes as well as products and services.

value that achieves accessibility and high scale. The outcome of these motivations, processes and ends are frugal innovations that are affordable for consumers, adaptable to contextual circumstances, and accessible to vast populations. The empirical findings in this dissertation on the core characteristics of frugal innovation as being affordable, adaptable, and accessible are supported by practice based claims made by Radha Basu, Director of Frugal Innovation Lab (Basu, Banerjee, and Sweeney 2013). [19]

<See table 6.5, page 312>

Frugal innovation, with its diverse perspectives based on this empirical work, can become (and already is) a boundary object that is helping to bridge traditional practices with alternative ones and can bring together different actors motivated by different precepts around a common drive towards overcoming shortcomings of the past. These shortcomings can be market failure, governance failure, or technology failure. Social movements, civil society, academic researchers, commercial enterprise, and government departments all have their own motivations that drive agendas. But the core objective around frugal innovation is the same, to innovate in a way that uses means and achieves outcomes to do more with less for many and more people.

In any case, the purpose of this dissertation is not to strive in a contest to win construct identity or ownership. And the true value of this dissertation is not in defining what frugal innovation is or is not. In the end it does not matter what you call innovation under constraints as perceived by social entrepreneurs. Instead it is in the greater understanding of the various perspectives of social entrepreneurs, as depicted in the models of innovation

[19] Basu et al (2013) cite 'appropriate' as another characteristic dimension of frugal innovation. Although my respondents in this study also cited appropriate technologies, often embedded in the work of Schumacher (1974). I however infer this to be the same as adaptable technologies.

developed here, and in understanding the mechanisms that make innovation as perceived by social entrepreneurs different. Next, I briefly provide an overview of how this might be relevant.

6.6 Mechanisms enacted in frugal innovation

One may ask how does frugal innovation, which according to this study embodies social, technological, and institutional concerns, occur within extreme environments marked by resource and affordability constraints and institutional voids? One answer may have to do with an understanding of social needs recognition and use of design thinking, understanding of resource mobilization and use of bricolage, and understanding of collective action processes and use of social movements. The three processes or mechanisms, design thinking, bricolage, and social movements, by which frugal innovation addresses associated constraints are depicted in figure 6.3.

Socially, an understanding of the needs of local contexts using design thinking may help to capture what might constitute as appropriate for improving the social status of communities. Design Thinking (Rowe 1991; Brown and Wyatt 2010) refers to the methods and processes for investigating ill-defined problems, acquiring information, analyzing knowledge, and positing solutions in the design and planning fields (Wiki 2011). Particularly in the context of extreme environments design thinking offers the ability to combine empathy for the context in which the problem exists, creativity in the generation of insights and solutions suitable for that particular context, and rationality to analyze and fit solutions to the specific context.

My interviews with designers of the $20 Jaipur knee joint revealed patterns of empathy as a means to success before even the technology was considered. In comparison, Scott Summitt of Bespoke Innovations also set out to design prosthetics at low cost for developing market applications. Based on my conversation with Scott, he was by and large focused on the technology. By using materials and tools he was used to working with in the US, he was able to bring down the cost of a prosthetic from $50K to $5K, but he only later realized the price-performance point he was offering was not accepted by his target market which demanded closer to $500 levels.

Technologically, few resources may be available for the innovation process as well as for the affordability of feature-laden innovations. So existing solutions may be stripped of unneeded, superfluous, and expensive features and redesigned to make them more appropriate for local contexts. Resource mobilization processes such as bricolage try to make do with what one controls and has access to by combining pre-existing resources to accomplish an immediate task (Baker & Nelson 2005; Levi-Strauss 1967). In contrast, resource seeking involves seeking out and procuring standard resources which are meant for that specific task. Desa (2008) demonstrates that social ventures originate, develop and grow through bricolage in the absence of external financing or even when faced with low levels of institutional support. One way bricolage has helped this paradigm shift in price-performance is the shift from customized hardware centric design to using off-the shelf components and sophisticated software. GE's $8K-15K portable ultrasound machine versus its high-end $100K machine, shifted from hardware centric to software centric design by using a standard laptop. Software has virtually no marginal cost and development costs have been lowered through open source communities and by leveraging the availability of software talent in emerging markets.

This leads us into Louridas' (1999) claim that design thinking activity is a form of bricolage, which ties the combinatory nature of frugal innovation to draw from both the social and the technological concerns. Design thinking plays a role here not only because of its human-centric approach but also in its ability to quickly and iteratively prototype. Given the uncertainty involved in innovation endeavours, it is more important to learn quickly through testing and readjusting assumptions than to meet solid performance metrics (Immelt, Govindarajan and Trimble 2009). GE's ultrasound team in China discovered through rapid prototyping and field tests in rural clinics that ease of use was more crucial than first assumed. This led to simpler keyboards, built-in presets for routine tasks and greater training. Rapid prototyping and field testing means shorter product-development cycles which are made possible in emerging markets due to less stringent regulatory regimes and government approval processes. GE's development of the ultrasound in China reflected this shorter development cycle due to the country's less intricate approval process (Immelt et al 2009).

Desa (2008) empirically also found that the ability for technology social ventures to scale, particularly when they employ bricolage is limited. However, collective action processes that leverage existing institutions or offer new ones lead to a moderating effect in achieving high scalability despite bricolage use. Again, this ties the combinatory nature of frugal innovation to draw now from both the technological and institutional concerns.

Institutionally, innovation may have to deal with the local norms, rules, and manners of institutional arrangements to allow the spread and adoption of new products, services, and solutions. Collective action processes stem from social movements. Scholars of social movements have focused on collective political processes of institutional change that remedy perceived social and ecological problems, barriers, or injustices. King and Pearce (2010)

demonstrate how social movement theory serves as an explanation for the emergence of market heterogeneity (Schneiberg & Lounsbury 2008). Rucht (1999) defines a social movement as "an action system comprised of mobilized networks of individuals, groups and organizations which, based on a shared collective identity, attempt to achieve or prevent social change, predominantly by means of collective protest" (p.207).

Social movement research shows empirically that contentiousness is a source of market dynamism, for instance by encouraging innovation and by changing what is deemed acceptable practice (Rao 2009). The rise of the market for organic and grass-fed beef and dairy (Weber, Heinze, & DeSoucey 2008) is attributed to social movements helping to create consumer audiences for these once ignored products (King and Pearce 2010). Social movement literature has broadened from movements triggered by the poor and frustrated masses to resource and capabilities empowered mobilization by the middle classes and beyond to the new social movements fostered by elites who shape discourse and agendas. I find support for the argument that social movements form markets -- that in the case of frugal innovation, a coalition of academics, idealistic students, global policy people, business elites, funders, foundations, and ventures are collaborating, contending and negotiating to serve unmet needs for the world's underserved to create the market for frugal innovations. The major players identified through the course of my research are shown in figure 6.6. We see a myriad of state, market, and community actors and institutions involved in shaping this emerging market and field.

<See figure 6.6, page 306>

6.7 Summary

McMullen (2011) offers a theory of development entrepreneurship which lies at the intersection of social, institutional, and business entrepreneurship. Similarly, I have argued that frugal innovation resides at the intersection of social innovation, technology innovation, and institutional innovation. All three innovation subfields are emerging fields in themselves, but together offer challenging opportunities for scholarly introspection to test and refine theories of entrepreneurship, innovation, and strategy in unique contexts, such as those of developing and emerging market contexts or pockets of contexts in developed markets marked by resource and institutional constraints. The concept of frugal innovation is a useful way to conceptualize the process of integrating existing innovation types in extreme contexts. And I call extreme contexts because of contextual constraints and because frugal innovations in these contexts have to bear harsher conditions than do regular innovations. Unlike NASA, the 'mission' here is mundane: to create offerings for people who live and work at the least privileged interfaces of the modern world. And this is the 'why' of frugal innovation: A broadly shared view to provide consumer value/amenities with the feature of 'extreme affordability'. As the data and models show, these may be due to philanthropic, social, challenge, market or efficiency seeking reasons.

Figure 6.1: Contradictory assumptions among social entrepreneurs

How do you balance?		
Profit maximization	X	Social impact
More is better	X	More with less
Cost	X	Quality
Constraints	X	Slack
Localization	X	Globalization
Inst. Voids	X	Inst. Complexity
Adaptable	X	Efficiency
Sustainability	X	Scale

Figure 6.2: Theoretical model for frugal innovation

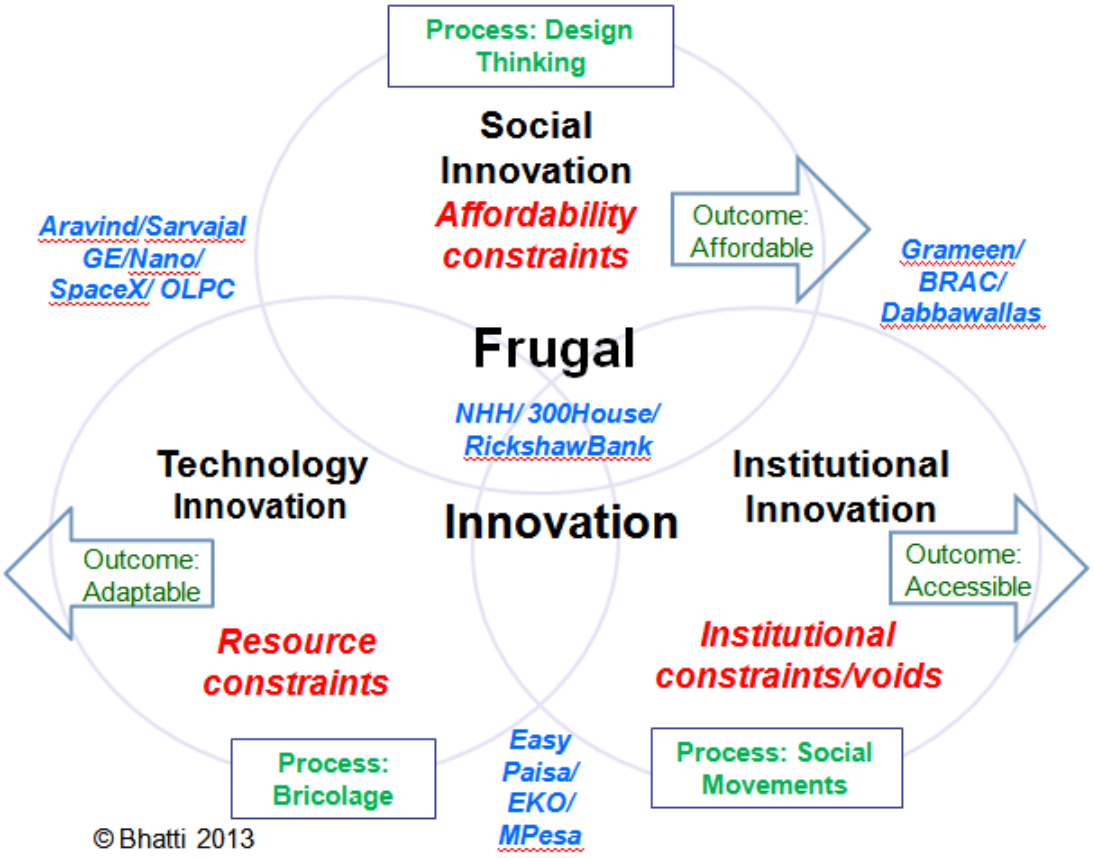


Figure 6.3: Price-performance space for frugal innovation ©Remotion *(used with permission)*

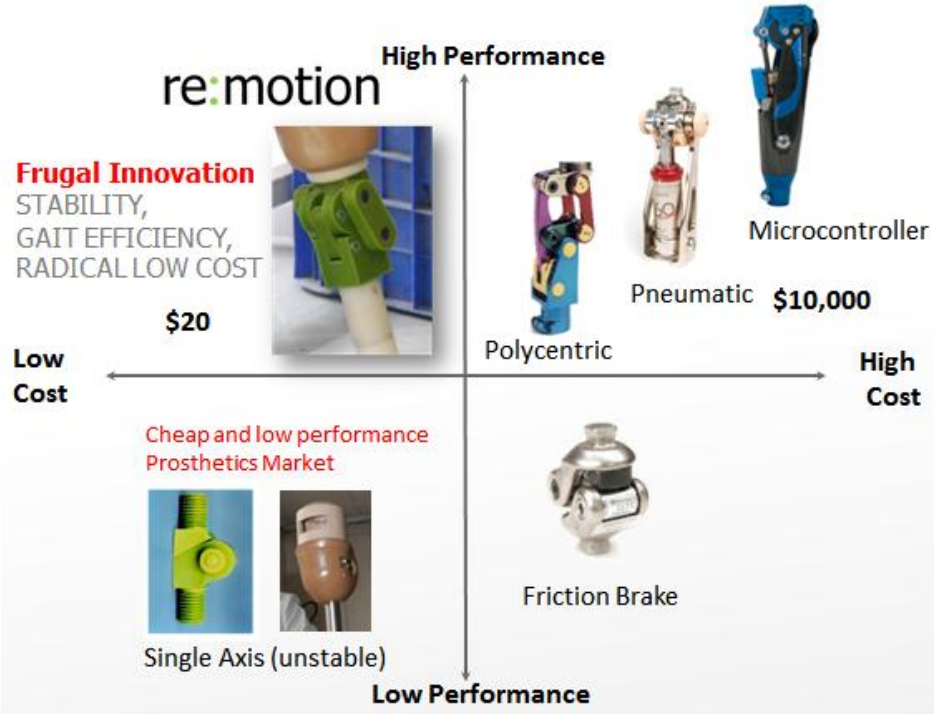
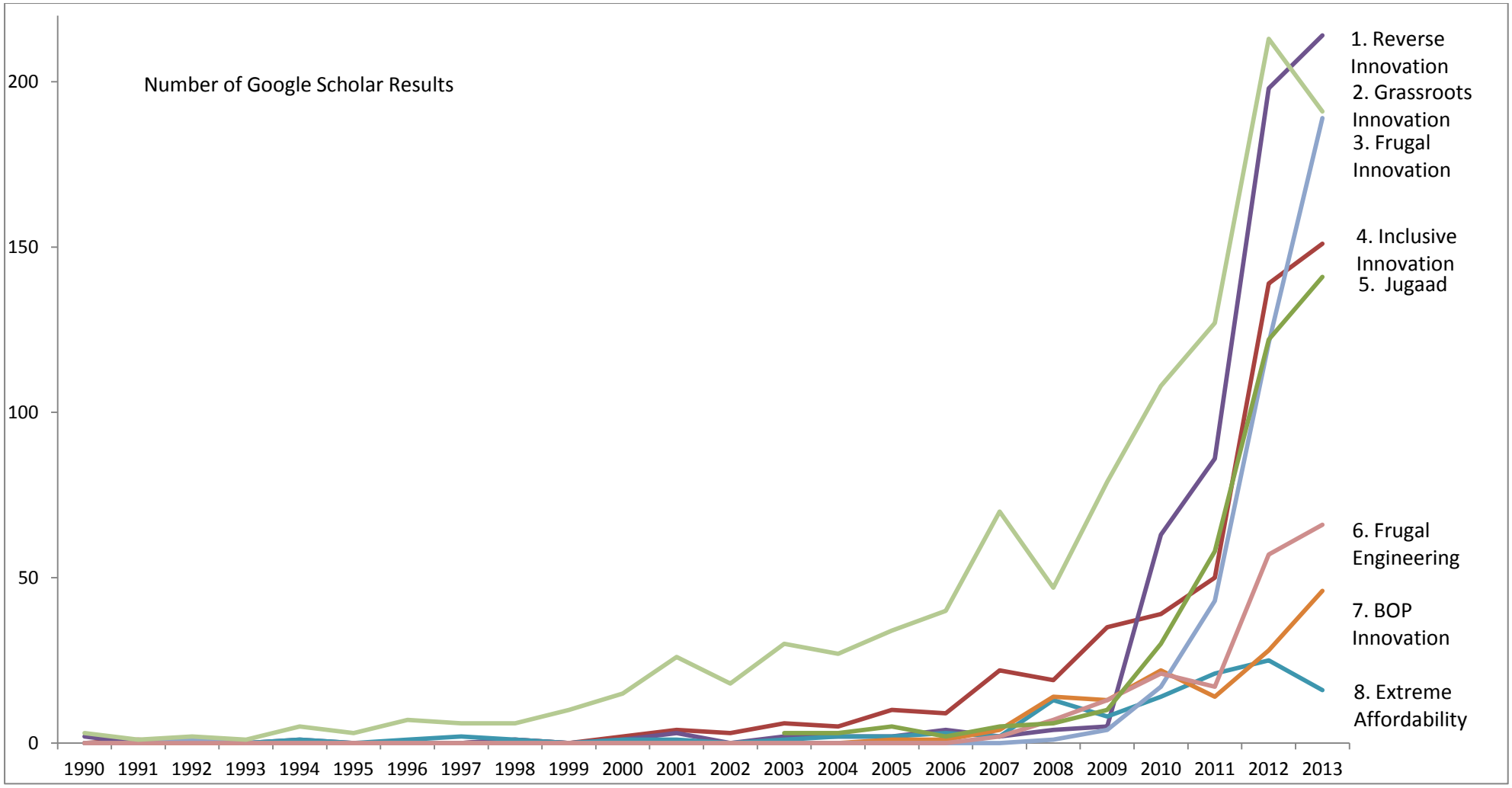


Figure 6.4: Number of articles related to frugal innovation



Two years ago the order was 1)Grassroots; 2)Reverse; 3) Jugaad; 4) Inclusive; 5) Frugal Innovation. 1990-2011 data retrieved in Jan-12 and 2012 & 2013 data retrieved in Feb-14. *Caution: Google Scholar algorithms may provide slightly varying search results over time.*

Figure 6.5: Definitions of frugal Innovation at different levels of abstraction

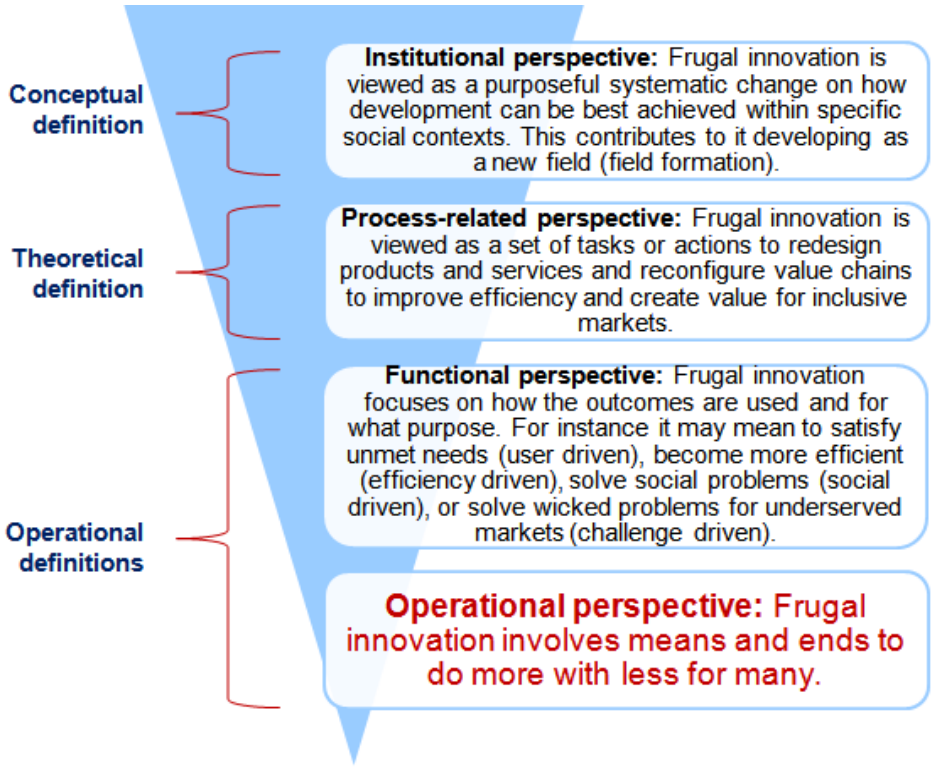


Figure 6.6: Mapping the ecosystem for an emerging field

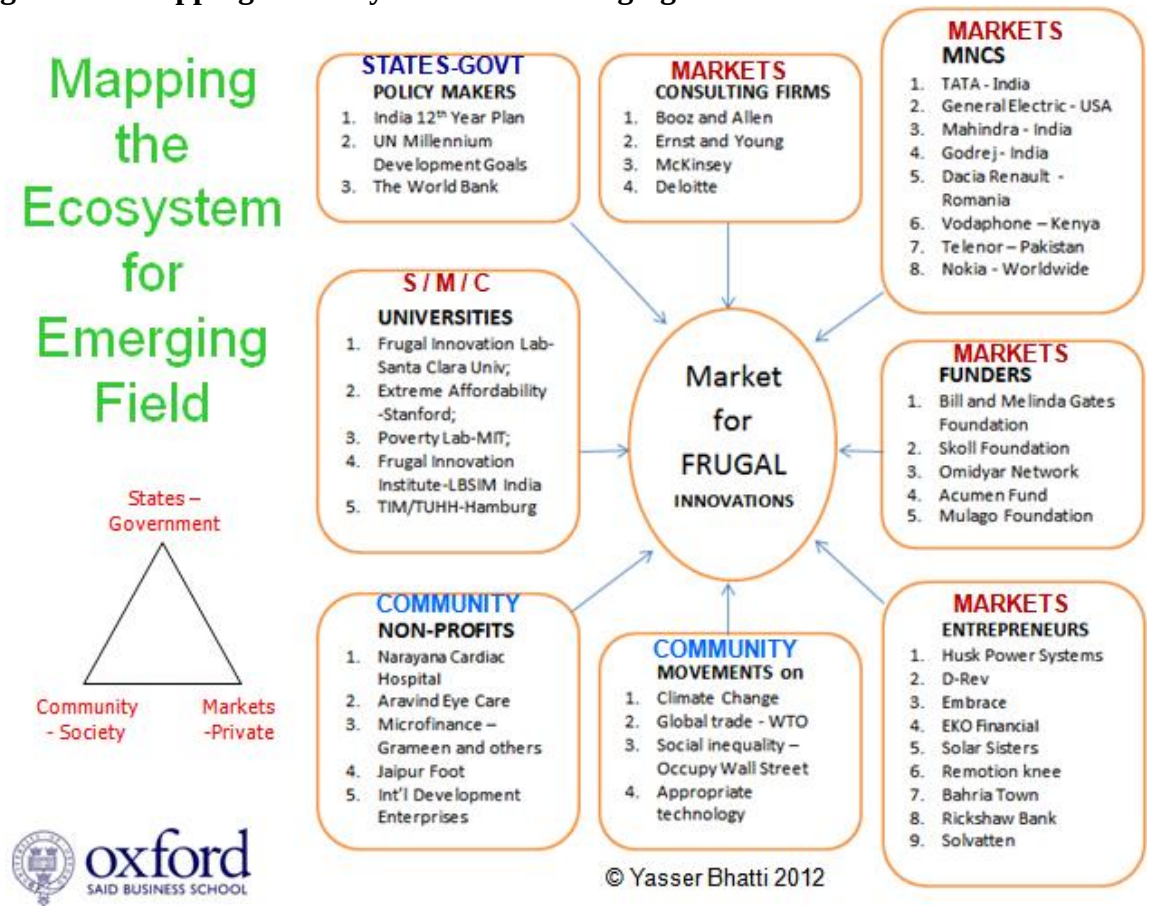


Table 6.1a: Data supporting intersection of Schumpeterian and social innovation

Research site A Interviews
Initially we imported pads but found that the pads were clogging toilets and were not biodegrading creating greater health risks. So we came up with a patent pending chemical less process to manufacture biodegradable pads. (11E) I agree we cannot design in isolation of the USA for developing country applications. Our cookstove was first developed by Engineers w/o Borders at Berkeley. But our engineers went back and forth to Sudan and worked with a local engineer. Through this back and forth our cookstove went through 14 iterations and we reached the current price of $16. So I don't think we designed and developed in just Berkeley and just dumped the cookstove, rather we tweaked it over and over again as necessary. (46E) Aurolab was initiated because we wanted the poor to have the same high end lenses, so it was a major contribution but not alone. For scalability we need to match global technologies with local applications. Among such global technologies was Aurolab and TIER IT service from Berkeley which integrated Aravind's 50 remote villages. (33M) And for the 'techie' students the frugal contexts present interesting challenges of different performance dimensions as well as an understanding of the whole ecosystem embodying engineering for humanity as opposed to just the role of technology. Take for instance the case of bridge that was designed and constructed by our engineers. When the team left, the bridge was rendered useless because the land owner took possession and started to charge to which the community was furious! (40F) Western engineering schools have not addressed these because designers here don't understand the problems and contexts in developing economies. However equally, engineers in developing markets are not the best designers, so they need partnerships to match problems in developing markets with designers in developed. (2M)
Research site A Documents
The need for locally relevant, language specific, content on the World Wide Web exists in every developing country (not to mention developed countries). XayanIT is currently developing a Bangla-language "portal to the World Wide Web" designed to increase the participation of Bangladeshis in the Information Age and exposure of Bangladesh to the world community. 2005s163 These technologies – like the hand-driven oil-expellers, bio-gas plants, smokeless stoves – have been evolving for decades, but have not received much attention from larger political movements. 2011s19 An important part of the program is local manufacture to keep the cost of the equipment as low as possible. It will be easy to establish local manufacture because no high tech fabrication techniques are required. Thus replication to other countries and regions is very possible. 2006s133 IkamvaYouth's use of cutting-edge technology in Khayelitsha --an environment where even basic infrastructure is lacking -- is unique. The GEI network consists of disadvantaged learning centers around the world, connected by web-based interactive software and VoIP, which has only very recently been legalized in South Africa. 2005s155 While many organizations promote technology transfer, EnterpriseWorks, almost alone, complements such technical activities with the development of the complete market for these locally manufactured technologies. 2006s119
Research Site B Interviews
In an ideal situation you would need different size interfaces. But in a resource constrained environment you can't do 100% efficiency. 95% efficiency is good enough. So the willingness to compromise doesn't really exist in the US, which isn't suitable if you want to take the technology to the developing world. And plus, looking at the device's low cost, it isn't really a super viable business. To provide it at a dollar or two at small scale to Bangladesh and India means it is hard to make ends meet. (B5E) There is one group I would really like to partner with. There are two orphans who learned from this Swiss guy who supported an orphanage and they have plenty of capacity to do good engineering. They use the workshop also as a vocational school for people to teach manufacturing skills. (B1E)

Table 6.1b: Data supporting Intersection of Schumpeterian and Institutional Innovation

Research site A Interviews

So good innovators can find markets for their inventions. Truth is, people will buy these if designed properly and efficiently distributed. So distribution will be the real key source of frugality. I've learned in this programme that I need to help my distributors to have the capacity to distribute, such as with access to financing. (25E)

Our business model would not have existed 5 years ago because i) people were not talking about this opportunity, ii) rural broadband was not available, and iii) water and health technologies were not ready. (7E)

Research site A Documents

In most cases, however, it is less that the technology or even the basic idea itself is new than that the technology is applied creatively to a wide variety of environmental conditions. (2006s140)

Even in the developed world, SMS is an effective communications medium for reaching vulnerable groups such as low-income families and frequent movers, for whom their mobile phone is their most reliable 'address'. 2011s44

ONergy creates and manages the distribution and service of appropriate renewable technology - effectively and creatively, by eliminating the middlemen. RECs are setup in partnership with MFI and NGOs. RECs operate in a sustainable (also financially viable), decentralised and scalable manner. The distribution and servicing network is managed by ONergy leveraging the network, infrastructure and local knowledge /goodwill of the partner. 2011s28

Research site B Interviews

It seemed there was a lot of low hanging fruit (in developing countries) that could and should be changed... throughout my time at Stanford I came to realize that a lot of the low hanging fruit has to do with design changes rather than policy. Policy seemed too slow for me. (B3E)

After being here and interacting with different colleagues in the university context, we hear of a lot of programmes from the department of science and technology about innovation design awareness and so on. So we see there is a lot of talk about it. Again this goes to the value of discourse, but there is a lot to be done yet. (B4E)

If you are not careful, things can get informal very soon. Sometime I miss the kind of structure we have at Stanford which is underlying the whole thinking process. Here in the Indian centre we have to be more deliberate about it. So part of my research deals with improvisation and what I see is that people here improvise quite easily. It is that element of rigor and process that needs to be brought in ... versus when I deal with engineers in US, they already have a structured approach and we have to loosen them up a bit more. There is that contrast to some extent. (B4E)

Especially we touch upon a lot on interaction between different disciplines, so between designers and engineers, and getting them into the same room and getting into discussions on design. (B4E)

I've thought through the process very differently. I have looked very little at how to disseminate the product, but more on how we can get it back. Our main service is collecting the waste matter, if that doesn't work, the system doesn't. So we assume once the toilet is out there, how do we service it. (B9E)

It was part of our goal to have it locally manufactured. Just for two reasons: one, I personally think it is better for a product that is made for Ethiopians is to be made by Ethiopians in Ethiopia so that if it breaks people know it is manufactured locally, and two, Ethiopia has very high import tariffs. So to try and make it somewhere else where manufacturing might be easier, like I can easily send drawings to India or China, but then I incur 100-300% import tariff. The economics work out better if we manufacture locally. (B1E)

The team on the ground in Myanmar, from what I understand, the most technical. They were good at making things, but they were not very good at coming up with new prototypes or just a high level design thoughts. They got better at this when David was back there. But there definitely was a working together of David with the people on the ground to make a design that was functional, could be mass produced, and to work out some of the small problems of the time. (B2E)

Table 6.1c: Data supporting intersection of institutional and social innovation

Research site A Interviews
Over the years, Engineers w/o Borders and other initiatives have made aware of projects around the world. For instance in Elsavador and Nicaragua we do projects where SCU has jesuit partnerships. These relationships and partnerships are crucial for our projects' implementation and success. (40F) In the USA if I ask people how much they pay for their water bill, they have no clue. But if I ask them how about their cable bill and they know exactly $102.67! This means we take for granted some of our very basic human rights such as water, and we consequently waste it. The water here costs only 1/2 cents per gallon and the quality of tap water is even better than bottled, because it is so much more heavily regulated. Yet we pay $1 for a small water bottle. (49M) I got involved in 'frugal' in the early 1990s when I was the first female professor at the engineering school here with very few female students. I took them to Housesafe near Santa Clara, a community programme for battered women and tried have my students solve some of their needs. So inequities lie everywhere and relatively speaking the differentials are worse in Silicon Valley where the rich-poor divide is huge. (40F) A challenge to VCs here (in the West) is that most social enterprises in developing countries are family run small businesses which will grow, but will probably never grab huge market shares to become the next high growth MNCs. In fact many of the developing markets do not have a culture of large firms. (10I)
Research site A Documents
It is possible that we could patent our system for online p2p microfinance. For instance, in the early days of the internet, a man patented online auctions and won a huge settlement from Ebay. Kiva will pursue a patent only for defensive reasons. It is against Kiva's ideals to offensively litigate against another organization, seeking to do good in the world, however. If awarded a patent, we would be very free in terms of licensing it to others in the space. 2006s128 At least two aspects of our innovation are replicable. First, we have found that a franchise-based growth strategy with clear toolkits and mini-grants for students is an excellent way to build a movement on campuses quickly and consistently. Second, we have found that new models of engagement for students that emphasize localized, concrete returns and professional development taps the contemporary student zeitgeist. Both of these innovations could be used to mobilize and engage youth effectively on issues other than foreign policy, such as health care, tax policy, or campaign finance. 2011s47
Research site B Interviews
The obvious answers that I am not giving you are capital for instance or funding. I think it may come from the fact that I sit in a very privileged context here where if there are great ideas, I feel confident that those ideas will gain access to capital. I don't even think that the typical entrepreneur sitting elsewhere in the US feels that way. So funding is a big hurdle, but for me I believe there is enough capital to help solve these problems, but it is just speculation from my privileged position. (B5E) The government does not like slums and generally have a policy of relocating or removing them. So while they say they will do slum upgradation, but at the same time they don't want to invest in permanent sewerage infrastructure which makes these slums permanent. They don't want to sanction or legitimize a lot of these neighborhoods, but they understand they are a threat to healthcare. So you don't want sewage systems but they are a source of Cholera that spreads to the whole city. (B9E) What's frustrating to me is that people keep bickering about stuff like that, but no one's doing something. So I think that is why I am interested in like what can I do something to actually make some impact to the base of the pyramid without waiting for the government to do something. So kind of like bypass the government, but not saying they aren't important. They have to go hand in hand, but maybe what I do can jumpstart to what I am looking at. (B10E) After our need finding trips we came to the conclusion that families in developing world not only needed a way to manage their own waste, because they didn't have the government infrastructure for water transport systems, as is common in most of United States and Europe, and also they need to for solutions that they could buy themselves and not depend on NGOs to distribute. So these solutions have to be based on business models that people would want to adopt and be able to buy and afford. What came out of that understanding was the design of the fertiloo, which is a composting toilet. (B7E)

Table 6.1d: Data supporting social-Schumpeterian-institutional nexus

Research site A Interviews

Based on lessons from 139 business models we found that cost reduction strategies include: 1) Local labor and materials, meaning close to beneficiaries 2) De-skilling to use local and low cost labor 3) Partnering with local experts especially for manufacturing and distribution 4) Disintermediation by eliminating the middle man and 5) M-commerce to leverage mobile phone ubiquity. (12F)

So the BOP wasn't taken seriously by mainstream VCs. Either the entrepreneurs there will have to find local investors or the VCs in Silicon Valley will change their strategies. The latter could happen if the VCs realize the benefit of developing products for developing market large populations. But overall it is hard to convince traditional non impact VCs to invest in developing markets based on technology and financial impact. (27I)

Jugaad or FI cannot work in the USA because those kind of cars and tractors would not be allowed to run on the roads here. Plus used cars are so affordable here that the need for a Tata Nano seems to not exist. (20F)

Research site A Documents

Instead of advocating a new technology or material, Build Change makes low or no-cost modifications to existing, common, culturally appropriate and preferred ways of building to create long-term change and reduce deaths, injuries and economic losses during earthquakes. 2007s58

Lastly to address the problem of affordability, Scojo Foundation has commoditized reading glasses by making them a consumer product that is easily sold by the women entrepreneurs thereby taking them out of the exclusive hands of eye care professionals. This mimics the successful shift that occurred in the West that made reading glasses a commodity item rather than one wholly controlled by eye care professionals. Through relationships with large-scale optical manufacturers, Scojo Foundation is able to source reading glasses at very low costs. These low costs coupled with efficient distribution systems allow Scojo Foundation to sell its reading glasses to the entrepreneurs at 50% margins. The profits from these margins will support investment in program replication and will reduce dependence on traditional sources of grant funding. 2006s132

Fund raising and scaling-up EnterpriseWorks is committed to establishing sustainable supply chains for technology transfer by training local manufactures and assisting them to promote technologies at a price that ensures a profit for them and a benefit for the end-user. 2006s119

Build Change empowers homeowners to design and build themselves with technical assistance. Build Change works with local builders to incorporate disaster-resistant building techniques that are easy to adopt with limited training and education. 2011s58

The approach begins with an active stakeholder dialogue to refine technology development and dissemination strategies; it ends with technical assistance and capacity building to enable local businesses and organizations to implement Envirofit solutions long after we have left. (2007s67)

The contribution of our work can be assessed from three perspectives:
Poverty reduction – We have been able to help more than 75 families to establish oil collection businesses. These businesses supply us with used oil. The families earn money which they are able to use for meeting their needs.
Environmental conservation – we have so far been able to collect 45,000 litres of used oil which would have been disposed into water systems in Kenya. Despite the fact that this is a may appear a small effort, it is contributing to the fight against water pollution in Kenya.
Economic – The recycled oil is sold off to buyers. Our organization is able to generate revenue from sale of used oil.(2006s118)

Information technologies increase business efficiency, organizational impact, and beneficiary scope while improving the economic, social, and political participation of individuals. (2005s163)

Competition from knock-off and imitation products- So quality must be kept high to establish a strong brand, and price must be competitive to any potential knock-offs. Our initial lighting product, the Angaza SoLite, is the brightest in its price range, the most accessible to our customers due to our rural distribution networks, and the most affordable through our unique leasing model, allowing even the poorest families to prosper from clean, bright light. (2011s40)

Research site B Interviews

So he said if you could build some financial models to help us position this to international donors, that would be a great outcome… They do traditional education and access to natural gas, and then they also do the design side and manufacture as well as financing side. So my model for them was to understand what their business was doing today and to predict what they need to do to breakeven. (B5E)

So I was saying that we incorporated elements of not only engineering and design with local communities, but also of including finance and investors who might be part of growing businesses and ventures. (B4E)

So I did a co-term Masters degree in systems. I basically created my own major. So it was probably 40% design classes at D-School, 40% mechanical engineering classes at the Product realization lab, and then 20% international development theory classes. So basically my whole motivation in my fifth year at Stanford was to get into extreme affordability. (B3E)

Table 6.2: Categorizing case examples according to models of innovation 1 & 2

Model 2 / 1	**Technology-Social intersection**	**Institutional-Social intersection**	**Technology-Institutional intersection**	**Technology-Institutional-Social**
Social based	Aravind	Grameen		Narayana
Efficiency based	GE		Easy Paisa / M-Pesa	
Challenge based	Tata Nano Space X OLPC			300 house
User based		Dabbawallas		

*Case examples are described in section 6.5

Table 6.3: First order codes that support 'reverse innovation' needs gaps

Performance gap:	*High performance*	*Improve Efficiency*	*Good enough*	*Making do*	*(De)Sophistication*
Infrastructure gap:	*Distribution*	*Supply Chain*			
Sustainability gap:	*Economic Sustainability*	*Environmental Sustainability*			
Regulatory gap:	*(Un)structured*	*Partnership*	*Legitimacy*		
Preferences gap:	*Context*	*Culture*	*Aspirational*	*Needs*	*Affordable*

Table 6.4: Comparative table of frugal innovation against related concepts

Constraints	**Affordability constraints**	**Institutional voids**	**Resource constraints**	***Differentiator***
Components	**Social innovation**	**Institutional innovation**	**Technology innovation**	
Outcomes	**Affordable**	**Accessible**	**Adaptable**	
Reverse innovation	SOMEWHAT	SOMEWHAT	YES	*International strategy driven*
Grassroots innovation	YES	SOMEWHAT	YES	*Bottom up source driven*
Inclusive innovation	YES	SOMEWHAT	YES	*Outcome driven*
Jugaad	YES	NO	YES	*Process driven*
FRUGAL INNOVATION	YES	YES	YES	*Bridges above domains*

Table 6.5: Frugal innovation definition covers many facets

Definitional components	**Encompasses**	**Outcome**
Means and ends	Process and Outcome	Affordable
To do more with less	Efficiency and or bricolage	Adaptable
For many.	Social and economic value	Accessible and scalable

7 CONCLUSION

The overarching research question of this study was 'How do social entrepreneurs broadly conceptualize innovation and specifically under extreme contexts marked by institutional voids and resource scarcity?' This was broken down into three sub research questions each with specific objectives and significance for existing theory and practice. I investigated the research questions using qualitative methods by studying two communities of globally networked and formally recognized social entrepreneurs (though most of the data drawn and used for analysis was from one community).

Overall this study contributes to developing models of innovation among social entrepreneurs and how these models are shaped by contextual conditions marked by institutional voids or complexities and resource scarcity. This work helped reveal perceptions on conceptual drivers and determinants, and features of innovation as viewed among social entrepreneurs. **On innovation** I found that social entrepreneurs are involved in more than simply social innovation; they use a combination of existing innovations, were more likely to be concerned about institutional and social innovation than technology innovation, and are packing combinations of innovations into a new emerging concept -- frugal innovation. **On constraints to innovation** I found that extreme contexts marked by constraints are not unique to developing or emerging markets but also exist in pockets of developed markets, that social entrepreneurs and their customers face a combination of constraints to innovation – institutional voids, resource and affordability constraints, and that social entrepreneurs are more focused on challenges of resources while investors are more focused on institutional challenges. **On methods** this work is one of few qualitative studies that acknowledges the use of retroduction, as opposed to a purely grounded theory inductive approach. This approach benefits from an iterative deductive-inductive process that helps make the research

transparent and rigorous. There is no dearth of works that purport to use a purely grounded theory approach but remain of questionable with regards to the genuineness with which researchers claim to completely let go of any pre-conceived notions of what they are looking for or may find. Although initially I too tried to pursue a grounded theory approach, I found it humanly difficult to enact in practice. Instead I found the retroductive approach as more honest and reflective of the iterative sense-making process of research design, defence, and implementation through which my research progressed. Further, this methodological approach helped to avoid some of the complications of perceptions being considered as purely 'socially constructed'.

One of the main goals of this study was to reveal insights on how organizational theorists can better frame models of innovation to understand innovation among social entrepreneurs in extreme conditions. Model 1 on innovation as viewed by social entrepreneurs is revealed in chapter 4 and model 2 on innovation under constraints as viewed by social entrepreneurs is revealed in chapter 5. I outlined evidence to suggest that a new innovation field, that of frugal innovation, is emerging from the varying perceptions of conceptual drivers and determinants, and key features of innovation divulged in these two models of innovation. I found that social entrepreneurs use a combination of existing innovations and repack them to address problems and contexts relevant to their market segments.

The findings and discussion in chapter 4 suggest that social entrepreneurs vary in how they view and justify innovation. I show that innovation among social entrepreneurs is not limited to socially driven and chapter 4 outlines in detail the variance in views. This finding suggests that a sole focus on one type, mainly social innovation, in the existing literature needs to be assumed with greater suspicion. In chapter 5 I outlined analysis and findings to

address the next two research questions. Again I found social entrepreneurs have varied concerns and approaches to innovation under constraints. I developed propositions that drew from the revelation of diverse perceptions of what innovation is for and among social entrepreneurs under constraints and proposed a second model of innovation in chapter 5.

However, the two models of innovation I developed are neither contradictory nor necessarily complementary. Even though the two models look at and portray different aspects of innovation as perceived by social entrepreneurs, they both together support the need for new theory development for frugal innovation. This emergent concept provides some cohesion to the seemingly disparate notions of innovation among social entrepreneurs described in models 1 and 2. Chapter 6 integrates lessons from these two models of innovation to propose first steps towards a theory of frugal innovation under constraints.

This study suggests that innovation among social entrepreneurs can be conceptualized as a multi-dimensional construct with three innovative process components; social, institutional and technological that help to achieve three outcomes components; affordable, accessible, and adaptable, all towards an effort to address three main constrains or challenges; institutional voids, resource scarcity, and affordability constraints. A multi-dimensional construct consists of a number of interrelated attributes and dimensions and exists in multidimensional domains (Weerawardena and Mort 2006). In accordance with Law, Wong, and Mobley (1998, p 741) who write, 'In contrast to a set of interrelated unidimensional constructs, the dimensions of a multi-dimensional construct can be conceptualized under an overall abstraction, and it is theoretically meaningful and parsimonious to use this overall abstraction, as a representation of the dimensions', I use the term frugal innovation to refer to this overall abstraction of social, institutional, and technological innovation that helps achieve

outcomes that are affordable, adaptable, and accessible. The proposed empirical models capture the conceptual characteristics of innovation among social entrepreneurs within the broad environmental and operational constraints marked by resource scarcity and institutional voids.

Operationally, I define frugal innovation as "***means and ends to do more with less for many***" (table 6.5).[20] The "means and ends" describes the component of innovation that can both be a process as well as an outcome. The "to do more with less" describes the notion of efficiency in process and outcome as well as use of bricolage to get more out of few resources. The "for many" describes both the generation of economic and social value that is highly scalable. I expect the findings and theory development proposed in this work to have profound implications to theory, practice and future research. A brief overview of these implications and lessons is outlined in table 7.1 and is described in detail in next three subsections.

<See table 7.1, page 339>

7.1.Implications for researchers

This research and the findings outlined may contribute to insights into theory building in innovation among social entrepreneurs (Mulgan 2006) and to understanding innovation management concerns (Van de Ven 1986; Leonard-Barton 1988) as applied in extreme environments marked by constraints. I applied Poole and Van de Ven's (1989) logic of paradox resolution to develop a theory of frugal innovation which better captures the complexity of different assumptions involved in understanding the phenomenon of

[20] I however offer other definitions that are conceptual and theoretical in nature (please see figure 6.5).

innovation in extreme environments as perceived by social entrepreneurs. I offer the findings of this study embodied in these models as a contribution that should pave the way for future researchers to develop a more theoretically grounded and programmed body of research in the emerging field of frugal innovation. In understanding what the space for frugal innovations looks like and how it can be organized, I proposed two models to theoretically conceptualize 'frugal innovation', one based on drivers to innovation in chapter 4 and the second based on constraints to innovation in chapter 5. I drew upon resource constraints, affordability constraints, and institutional voids to develop a theoretical framework to analyse innovation under constraints.

In model 1, I conceptualized the sources and determinants of innovation along two key characteristics or dimensions, mainly need or vision and proof of concept or scalability. Literature has for the most part relegated social entrepreneurship and social innovation to ideational and globally scalable, the top right hand quadrant in model 1. But this study empirically reveals that social entrepreneurs also perceive their innovation activities along the other three quadrants, all of which find corroboration in existing literature – grassroots and user-based; efficiency and corporation-based; and challenge and network-based. Yet these are not generally associated with social entrepreneurship or social innovation. This suggests that a broader view of social innovation may be helpful to better align different theoretical assumptions with actual conceptualizations of practice.

In model 2, I conceptualized the nexus of social, institutional, and technology innovation as fertile overlaps that aid in identifying, understanding and positioning frugal innovations. These spaces drew from the validation of my theoretical assumption that social entrepreneurs and their customers face a combination of constraints to innovation –

institutional voids, resource and affordability constraints. The examples I presented as fitting in the different intersections of the typology in model 2 are based on both empirical data as well as published accounts. Although mine is an exploratory research, the findings of which need to be further tested, this exercise shows how the overlapping spaces within which frugal innovation activities are carried out are useful in understanding existing case studies. Further research can inform on the success and failures of frugal innovation strategies and of the necessary capabilities needed for firms to adopt them. The theoretical propositions outlined can in future work be tested to try and understand innovation trends among social entrepreneurs in unique contexts such as those marked by resource constraints and institutional voids.

In terms of theory, there is potential to demonstrate that a peculiar kind of innovation under constraints, as a concept, idea, framework, or process, is being articulated by social entrepreneurs – i.e. frugal innovation – the impact of which may diffuse to mainstream entrepreneurs and large corporations. Frugal innovation could pose an opportunity to disrupt prevalent innovation assumptions. For instance, in contrast to innovating only when the right components of a National Innovation System (Lundvall 1992; Freeman 1995) are present, the idea of frugal innovation enables recognition of an approach to innovation which is catching on in particularly extreme environments despite or because of resource constraints and institutional voids. In contrast to the view that innovation occurs only when slack resources and supporting institutions exist, and that high income users are often the first target segment of choice, frugal innovation suggests all three may not be necessary to produce globally useful solutions. Empirical studies that test this theory and its ability to generalize beyond social entrepreneurs can be a next step.

On methods, this is one of few qualitative studies to acknowledge the use of retroduction in significant research of this scale and scope, as opposed to a purely inductive or deductive approach. Most research has clearly differentiated between either a purely inductive or deductive approach. However, Ragin (1994) argues that in many research settings, it is neither possible, nor is it beneficial to argue for one approach over the other. Instead, an iterative combination of inductive and deductive makes it possible to acknowledge the evolving understanding researchers develop simultaneously of phenomenon and theory.

In retroduction I used an inductive -- deductive iterative approach that helped achieve both reliability and validity. On the one hand, criterion of reliability induces analysts to derive standard categories from theory that could be repeatedly used. On the other hand, the criterion of validity calls for analysts to inductively develop original categories that stem from the phenomenon (Srnka and Koeszegi 2007; Druckman and Hopmann 2002). Through retroduction, I acknowledged how prior knowledge of innovation studies shaped my initial codes and constructs to determine what I was initially looking for in my data as part of template analysis (King 2004). However, as the process progressed, I iteratively changed and adapted the template of codes and constructs to better address the research problem and match the themes gathered from the data. This back and forth process of using theory for deduction and then inductive analysis helped generate new theoretical models of innovation. I believe retroduction is a powerful methodological means of acknowledging the limitations of purely deductive and inductive approaches in long term and emergent studies such as this one. Essentially it helps researchers to be more honest with themselves by acknowledging and making use of limited theoretical understanding but then also enabling the search for a new or at least extended theory.

Among the most influential social scientists is Daniel Kahneman who won the 2002 Nobel laureate for "having integrated insights from psychological research into economic science" (Goldstein 2011, online). According to the Thomson Reuters Web of Science, Kahneman and his prospect theory has been cited in scholarly journals more than 28,312 times since 1979. Jevin West of the University of Washington helped develop an algorithm for tracing the spread of ideas among disciplines and comments on Kahneman, "Kahneman's career shows that intellectual influence is the ability to dissolve disciplinary boundaries" (Goldstein 2011, online). In much the same way, I believe this attempt to understand innovation among social entrepreneurs through the proposed theoretical models dissolves the disciplinary boundaries of technology, social, and institutional innovation literatures, as depicted in model on innovation 2.[21]

7.2.Implications for practitioners

Keller and Price (2011) argue in their McKinsey study of business performance that innovation and change have replaced scale and stability as determinants of organizational survival and success. Today executives are searching for distinctive and competitive ways to increase innovative capacity both within and outside of their organizations (Van de Ven, Ganco, & Hinings 2013). In terms of practice for enhanced business performance, the theoretical models I offer to understand frugal innovation can help firms and entrepreneurs seeking to innovate in extreme contexts marked by resource scarcity and institutional voids, to analyze and categorize the different approaches to innovation based on which nexus of constraints they need to address and leverage. In chapter 6 I showed how the two models can be used to map existing popular cases (table 6.2). Should contextual factors and demands

[21] I can only hope the work presented here postulating the promise of frugal innovation will be as popular as the work of Kahneman.

change or should firms wish to enter different or home markets, an awareness of the need to reposition to other complementary innovation subsets can be valuable for strategy reformulation.[22]

As an example exercise, whether one would categorize Ebay's service as a frugal innovation or not, we can briefly think about how the two models can be used to explain Ebay's evolution. Some scholars (c.f. Martin and Osberg 2007) suggest that Ebay can be considered a social innovation which has globally changed the way society buys and sells as well as extracts value by reusing goods otherwise destined for garbage dumps.

Model 1 suggests that organizations may face different innovations at different times and different contexts throughout their life-cycle. Model 2 suggests that functioning within overlapping innovation spaces can be necessary for growth but also be very challenging. Ebay, like many entrepreneurial projects, started in the lower left quadrant of model 1 where it began as a project by Omidyar to test a proof of concept that fulfilled his girlfriend's need to collect, buy and sell 'Pez' dispensers. The proof of concept caught the attention of the start-up system in Silicon Valley to move the project up to top left quadrant of model 1. Overtime, as the business model evolved with the acquisition of Paypal, an institutional innovation in itself by which money is transferred and deposited, Ebay was able to reach out globally to locations where the banking sector was not conducive to online transactions and enabled cross-border transactions of goods and services. By combining internet technologies with institutional change in monetary transactions, Ebay and Paypal together were able to change social behaviour to make goods and services more affordable, accessible, and

[22] Although the models can be useful strategically for practice, I caution here that this research mainly addresses models of perceptions of innovation and the emergent definitional concerns on frugal innovation based on qualitative analysis of case studies, without consideration for success or failure, as opposed to an evaluation of business performance.

adaptable to local contexts but with global integration. The core lesson -- to be positioned in the centre of model 2 where all three innovations meet can be both epitomized but also can be the most challenging which may require progression over time through various quadrants of model 1.

Another lesson for practitioners is the increasing effort to bridge social entrepreneurs with mainstream businesses. On the one hand, I found social entrepreneurs were more likely to be concerned about institutional and social innovation than technology innovation in the pursuit of creating social value. On the other hand, social entrepreneurs referred to examples of mainstream large businesses using technology innovation to build social value. Despite these differences in approaches, the use of frugal innovation as a concept by both social entrepreneurs and mainstream businesses suggests there may be common concerns under consideration by both communities. As a conceptual term, the idea of frugal innovation seems to help bring business into the activities of social entrepreneurs and to bring social into the activities of corporations (figure 4.4). But this also shows that frugal innovation isn't an entirely new or different concept or approach to innovation, but can be useful to bridge two business communities i.e. social entrepreneurs and large corporations which ostensibly have little in common.

This work also showed that extreme contexts marked by institutional voids and resource constraints are not unique to developing or emerging markets but also exist in pockets of developed markets. Although the level of both is higher in the latter, the former markets can be fertile spaces for frugal innovation activity. As the West looks to the East for innovation, ideas, and entrepreneurship (Cappelli et al 2010; Ming-Jer and Miller 2010), frugal innovation could offer fresh ideas and new perspectives in cost minimization and

innovation maximization to a world slowed down by the recent recession, i.e. by doing more with less (Bhatti and Ventresca 2012; 2013). On this, Woolridge (2011) argues frugal innovation will change the world in the same way Japanese lean manufacturing once did.

In some ways, the activity of frugal innovation is already catching on in the West in its own way, possibly due to changes in preferences and needs that stem from demographic changes. Firms may recognize and adapt to these changes. For instance, aging populations are putting increasing pressure on public finances such as the NHS in UK and the Medicare programme in the USA. Govindarajan and Ramamurti (2013) propose the US can learn from innovative low cost and affordable healthcare models in India. And there is increasing preference among youth for collaborative consumption where car (Zipcar and RelayRides), house (Airbnb), and baby clothes sharing (Plumgear) are brokered by web start-ups in San Francisco that use existing publicly owned assets. These are in many forms and practices reflective of frugal innovation (Bhatti 2012; Bhatti and Ventresca 2012).

There is also evolving work in international management by Govindarajan and Trimble (2012) on reverse innovation strategies for firms seeking to internationalize. Many, although not all, features of reverse innovation resonate with frugal innovation. Jeffrey Immelt, CEO of GE and colleagues argue (2010) reverse and frugal innovation strategies help GE to not only flourish in India and China, but also bring back those lessons learnt to the US for new applications, new market segments, as well as for recessionary periods.

Overall, the strength of social value enhancing strategies and frugal innovations that revolve around the three main outcome factors outlined, mainly adaptable, accessible, and affordable, means that firms can discover new applications and market segments previously

overlooked. For instance, firms equipped to implement strategies for adaptability, accessibility, and affordability could better capitalize on periods of recessions, and not just have to ride them out and struggle to stay afloat. With the cyclical waves of growth and recession an almost inevitable law of economics, firms may benefit from learning new ways to not only capitalize on growth but also recessions. Some firms, for instance budget retailers like Tesco, Primark, and Walmart do well not only when the economy is growing but do just as well, if not more, during times of deceleration. The predominant lesson these firms bring to times of recession and depression are in ways to cut costs and do more with less. Combine this with the ever rising energy and raw material prices, and firms are seeking ways to become more efficient and be able to more with less. Institutionally, developed markets are regulating harder and heavier for firms to meet tight environmental standards. Functioning under resource constraints may help firms to meet this tighter environmental regulation. As ambidextrous organizations (Tushman, Anderson, and O'Reilly 1997) seek to balance exploration of new product development and exploitation of breadwinners, I propose that firms can embrace frugal innovation strategies alongside their conventional innovation pursuits.

Firms that adopt frugal innovation strategies can also be better equipped to compete in emerging and growth markets of the world. Tiwari and Herstatt (2012) use the theory of "lead markets" to explain the rise in sourcing frugal innovations from India and Tse, Jullens and Russo (2012) cite examples of the emergence of a new category of high growth low-price, medium-quality Chinese companies which are shaking up the global competitive landscape. Tse et al cite reasons for this emergence on China's enormous size and complexity of its customer base among other political, economic, and infrastructure characteristics. The goal for these companies is "Mercedes-level quality and attractiveness, Toyota-level durability and

margins, and Skoda-level prices." (p.36) Carlos Haertel of GE says the rising popularity of frugal can be attributed to a demographic tipping point. He cites the size of the market opportunity that has changed: "These products were always technically feasible. The fundamental change is that in India and China you now have mass markets that are price sensitive but have a massive purchasing power."(Woodward 2011, online). Such frugal innovations pose opportunities not only for emerging markets, but also developing and developed markets.

I have hinted how global firms such as General Electric and Tata seek to learn from opportunities that force them to do more with less by developing strategies that are socially equitable, ecologically sustainable, and economically profitable. Jeffrey Immelt, CEO of GE and colleagues argue (2010) reverse and frugal innovation strategies help GE to not only flourish in India and China, but also bring back those lessons learnt to the US for new applications, new market segments, as well as for times as recessions which require cost minimization and impact maximization.

However frugal innovation is not a panacea for all problems or needs. Indeed, there are situations where it may not always be a good idea. As Woodward (1965) and Lawrence and Lorsch (1967) found from studying why different organizations had different organizational designs, that there may not be "one best way". Take for instance the desire for low cost medicines or food supplements (Topol 2011) -- overly processed low-cost mass produced food has been criticized for long-term detrimental effects such as obesity and cancer. Generic low-cost medicines that have escaped rigorous testing standards have been involved in criminal neglect and dangerous consequences. The negative aspects of frugal innovation deserve further investigation.

Another interesting finding that has implications to practice particularly for entrepreneurial firms was that social entrepreneurs are more focused on challenges of resources while investors are more focused on institutional challenges. This may explain why investors and social entrepreneurs have a difficult time speaking to each other in the same language that could facilitate greater investment in social ventures. And these differences in the perceptions of the social entrepreneurs on their sources of challenge and those of their investors may be explained by felt differences in their own situationally 'perceived contingencies'. Investors are wary about the nature of institutionally underdeveloped contexts in which they invest. Social entrepreneurs instead seem to be more focused on the need for greater resources to, in part, overcome these contextual constraints. This suggests, the problem might be one of chicken and egg -- would greater resources help to ameliorate institutional challenges, or would fixing the institutional challenges lead to greater attraction of resources?

7.3.Implications for policymakers

India's government has been bold to include cite frugal innovation or solutions in its 12th five year plan as a means to achieve inclusive growth. In the UK, innovation think tanks NESTA and SERCO are espousing the merits of frugal innovation for UK's public sector such as the NHS. Professor of Surgery Lord Ara Darzi of Denham, who served as Parliamentary Under-Secretary of State in the Department of Health during Prime Minister Gordon Brown, is a proponent of greater adoption of frugal innovation in the UK and abroad to achieve universal health coverage. The Innovation Centre Denmark under the auspices of the Ministry of Foreign Affairs of Denmark seeks to impart lessons in frugal innovations particularly those from emerging markets to Danish companies. And as shown in figure 6.6 (Mapping the ecosystem for an emerging field), different players from the public, private, and

civil sectors are in the process of negotiating the space and terrain of frugal innovation. The fact that broadly social innovation and specifically frugal innovation has caught the attention of researchers, practitioners and policy makers, suggests that this developing field of innovation studies should reach a wider community of impact and offer scope for timely and relevant policy making.

This thesis investigated ‘how innovation differs’ and specifically sought to understand how institutionally complex and constraint-based innovations in low resource settings for underserved market segments differs from prevalent models of innovation. ‘Frugal innovation’ itself is a potentially challenging paradigm for innovation to date with a wide range of entrepreneurs, firms and other institutional actors (foundations, policy institutes) embracing the term ‘frugal innovation’ without adequately theorizing what it actually means. As a finding, this work offers to the all these players an in-depth understanding of the drivers, determinants, and dimensions of frugal innovation.

Take for instance the healthcare sector where frugal innovation has been largely associated with affordable innovations. But affordable or low cost products and services are only part of a more interesting and unexpected process of value creation and appropriation. Instead of focusing only at the production of particular, low cost healthcare artefacts or products, the models of frugal innovation in this study take into account the wider value creation or value chain processes supporting those products. Although healthcare projects and policies are cited as more affordable or accessible, this study’s lens on frugal innovation permits fuller attention to not only challenges but also opportunities in institutionally 'complex' contexts marked by lack of market or public based health services.

There remains much to be researched about emerging trends in frugal innovation. From chapter 7 it may be recognized that evidence supporting frugal innovation is at best anecdotal. There are few, if any, frameworks available to policymakers to benchmark and evaluate frugal innovations. And the models of innovation proposed in this study can help discover, synthesise and document evidence of designs and implementation of projects and policies in several public sectors such as healthcare, transportation and housing. For instance the models can be useful to identify and evaluate projects around several constructs that coalesce into key outcome dimensions of affordability, adaptability and accessibility.

As an example based on my own interaction, the Scandinavian approach to frugal innovation, including those by the Universe Foundation and the Innovation Centre Denmark, is limited to market segmentation for lower cost products. In this effort, a core focus remains on strategies associated with design and production of technology for mid-tier markets. This study suggests that other localized dimensions, such as those of social and institutional makeup are critical factors should Danish companies wish to learn from and tap opportunities in extreme settings, in particular for lower-tier market segments. Additionally, many Scandinavian projects on frugal innovations encompass a top-down mindset of scaling down or de-featuring luxury goods to mid-tier consumers, whereas indigenous firms in developing markets pursue a strategy of bottom-up starting with lower-tier market segments and gradually improving offerings for mid and even top tier market segments. Consequently, the current research and development policies in Scandinavia which are geared for highly sophisticated often ‘luxury’ products and services may have to be reconsidered for frugal innovation to flourish either for export to emerging markets or cater to local concerns requiring frugal solutions.

Although the detailed constructs divulged in this work can be useful in establishing a first step towards identifying and measuring frugal innovations, policy makers may want to focus more on helping the field to experiment and evolve rather than trying to benchmark elusively 'ideal' frugal innovations. Given the quickly changing understanding of innovation under constraints or in extreme contexts, policy makers should only cautiously epitomize and tout the benefits of such domains which seek professional identity and are in flux (see discussion about Abbott in chapter 6). Policymakers seem to be focusing more on the operational focus of frugal innovations and instead may concentrate on the conceptual domain that is struggling to establish it as a field worthy of independent innovation research and practice. In figure 6.5 I allude to the conceptual abstraction of frugal innovation as being a purposeful systematic change on how development can be best achieved within specific social contexts to more operational abstractions that seek to identify and benchmark the phenomenon.

And given the persistent uncertainty involved in what the concept actually means or refers to suggests that I next need to acknowledge some of the limitations of this work as these limitations may naturally feed into opportunities for further research.

7.4.Limitations

Since this study sought to uncover the conceptualization of innovation among social entrepreneurs, it pursued the qualitative research path in which informants give their personal accounts of their perception of and sometimes of their personal involvement in innovation. Consequently, this study is exploratory and retroductive, that is both deductive and inductive by iteratively deductively drawing on existing theory as well as inductively analyzing empirical data from a group of social entrepreneurs who each individually serve as case-

studies. This is both a strength and possible limitation of this research. The strength lies in first-hand accounts of perceptions of innovation as well as an iterative process of deduction and induction that provides for a balanced approach between drawing a conceptual framework from existing literature and benefits of grounded theory. The limitation can be in terms of the robustness with which the researcher used triangulation of various data sources to make inferences and in satisfactorily following the guidelines of Ragin to institute retroduction – I have though tried to minimize these risks.

I accessed all case studies from two academically hosted programmes in Silicon Valley, and the cases are embedded in a distinct socio-political context. This is a critical decision as I choose to examine the motives and perceptions of a particular population – who are globally networked, formally recognized as social entrepreneurs, geographically and sectorally diverse, but generally conversant in English language, and who attend programmes based in the entrepreneurially driven free market economy of Silicon Valley. The programme organizers draw inspiration and strategies from the free market entrepreneurship model of Silicon Valley where the logic of property rights, risk, and revenue generation through innovative pursuits dominates. This means that their logics may, and probably are, very different from those of all other possible populations I could have chosen- including locals who aren't globally networked or formally recognized. Such differences appear in the literature such as in Sylvia Dorado's (2013) work on local Latin American entrepreneurs. And it is possible that if I were to conduct the same study of social entrepreneurs who are collectively drawn from say an academic programme in the East, the findings revealed herein may be slightly or significantly different.

Although I contribute to the literature on innovation, entrepreneurship, and social entrepreneurship, I recognize that more work is needed to improve and extend the models of innovation outlined. And although I drew respondents from different sectors and physical locations, further research could examine perception of innovation from more diverse cases and in diverse settings. This would allow for greater variation and quantity as well as enable cross sector and cross location analysis. I next outline limitations of this study specifically along the three sub-research questions and along the three substantive empirical chapters:

RQ 1 / Chapter 4:

Both the strength and limitation of this study is that it gathered and analyzed data on how social entrepreneurs perceive about innovation and said they do as opposed to what social entrepreneurs actually "do" (as in the works of Law and Callon 1988). I don't follow the actor but observe and interview the actors. So my findings rely on this narration of perceptions and implementation as opposed to what social entrepreneurs 'really' do on the ground. But since the objective of this research is to generate models of innovation from the perspective of social entrepreneurs rather than benchmark practices or processes, a reliance on perceptions and narration was deemed appropriate for this study's desired goal.

Another word of caution is that the findings reflect the GSBI's preference in short-listing applicants as social entrepreneurs. However, the GSBI is a decade long world renowned programme that has helped nurture many of the most globally prominent social entrepreneurs. The various exercises and steps involved in the application combined with expert committee reviews of applications helped mitigate any individual bias on who would constitute as a social entrepreneur. Nevertheless despite this possible limitation, the

innovation model revealed provides a stylized view of how globally networked and formally recognized, and many well-established social entrepreneurs view innovation. Consequently my typology provides a useful starting point for broadening the limited notion of social innovation and uncovering the range of innovation types perceived by social entrepreneurs.

In chapter 5 I looked at variation in responses across entrepreneurs, mentors, and investors. But a step towards more fine grained analysis can attempt to show how the diverse types of respondents adhered to the different themes divulged here – was there geographical variation in the responses? Is there an overlap across certain regions or are they distinct?

RQ2 and RQ3 / Chapter 5:

In this chapter I used a value chain perspective to analyze how social entrepreneurs perceive innovation activity under institutional voids and resource scarcity. Although the value chain approach has been useful in outlining the findings revealed here, the value chain is perhaps most applicable to analyzing actual activities. So a word of caution is that my data is about how social entrepreneurs described the activities they were involved in and not those activities the researcher observed first hand.

And this was because I gathered data on what social entrepreneurs and those who work with them perceive about innovation and said they do, and for the second two research questions, under constraints. This data does not reflect objective observations of the activities of social entrepreneurs in action. The findings therefore reflect the idiosyncratic views of entrepreneurs who attend the GSBI programme and represent a globally networked and recognized community of social entrepreneurs.

But recall the objective of the research was to reveal models of innovation under constraints as perceived by social entrepreneurs, which have been successfully revealed based on data, analysis, and findings. I believe these findings and the models proffered provide valuable insights into how social entrepreneurs view innovation under constraints and potentially deal with these constraints. This study paves way for future research on observations of innovation activities on the ground under constraints.

Integrative chapter 6:

The claims on theory development of frugal innovation in chapter 6 may suffer from limited generelizeability to other similar or extended cases. But the purpose of qualitative studies is hardly to generalize. Instead it serves to provide insights into unique phenomenon and / or in unique settings. Similar to video ethnographers, I cannot make explicit claims about the generalizeability of my context specific findings. But in accordance with Goffman's (1983) "interaction order", I can assume that patterns and practices in one place will have relevance to other contexts (Streeck and Mehus 2005) and can however claim, that the findings from this study can have a wider relevance than that from the cases and context from where they drawn. The purpose of theory building in frugal innovation has been to hopefully motivate further empirical investigations of this phenomenon in similar and other contexts. Having now postulated a set of models that can be used for further hypothesis generation, future research could benefit from the strengths of quantitative methods to test out the theory propositions proffered in this work.

Toward enhancing the trustworthiness of data (Lincoln & Guba 1985) and robustness claims in this work, I used multiple data sources that allowed for triangulation of data (Hartley 2004; Yin 1994). But triangulation of data is only as beneficial as the objective

interpretive approach of at least two researchers who cross reference and validate constructs and codes generated. If the study was conducted from a purely realist-oriented ontology, one would ideally need to assure the reliability of the process through the use of two coders independently working with significant overlap for the reliability test (Neuendorf 2002), or at least for the initial template set to ensure the validity of the template (King 2004).

I am unable to claim this high degree of validity since I have been the sole researcher involved in codification. So among the limitations of my research design is the process of independent coding of qualitative themes. But my ontological position is of critical realism which cautions that what I perceive as real might be in part 'socially constructed'. The coding exercise was dependent on my understanding and interpretations of the 'verbatim' responses I gathered in interviews and archival documentation. It is possible that another researcher might code the responses in different ways. However I did take steps to minimize coding bias by following the method of template analysis, leaving an audit trail, and soliciting quick and constant feedback on themes already generated through working papers and presentations.

In the post-positivistic tradition, Trochim (2006) suggests the best way to improve our objectivity is to do it within the context of a community of truth-seekers who regularly criticize each other's work. Right from an early stage of developing the initial ideas and performing the analysis, I solicited critical feedback from peers and seasoned researchers including professors and students (Denzin & Lincoln 2000; Strauss & Corbin 1998). I had the findings reviewed and verified by my supervisors and other colleagues and mentors, but these individuals were not asked nor would they have been able to generate constructs and codes independently in the way suggested in inter-rater coder reliability tests.

Nevertheless, this reflexive process of "using the professional community provides a means to challenge and refine my developing theory and analysis to attain better validity" (King 2012, online). I routinely circulated working papers through my own website and the Social Science Research Network (SSRN) and presented work-in-progress at several conferences, such as the Trans-Atlantic Doctorial Conference at London Business School, May, 2012 and the Academy of Management in Boston, August 3-7, 2012, and then again in Orlando, August 9-13. It is expected that this repeated process of analyzing the data and reworking the findings and theory would have helped to critically validate the findings I eventually interpret and reveal in this four year-long study.

Some of the limitations above pave the way for future research that may overcome some of these limitations. More interestingly though, the findings from this study open way for intriguing possibilities and directions in innovation and entrepreneurship studies.

7.5.Future research

The strength of this work lies in raising interesting epistemological debate about the differences in scholarly descriptions of innovation and social innovation among social entrepreneurs and the actual perceptions of social entrepreneurs to innovation. Scholarly work has attributed social innovation to social entrepreneurs but has not adequately investigated the perceptions of social entrepreneurs to this attribution. This work has fundamentally analysed the views of social entrepreneurs on innovation under constraints. A more concrete next step could be to do a similar study on the views of social entrepreneurs specifically on social innovation. However that would be difficult task since as explained in chapter 2 on literature review, a definition of and understanding of social innovation is rather ambiguous and varied in the literature. It is much easier and more realistic, to ask social

entrepreneurs what they think about innovation in general, rather than about a specific form of innovation that only has an emerging understanding in literature, whether it be social innovation or frugal innovation.

So this study paves way for future research on observing innovation activities by social entrepreneurs in a more flexible, wider, and more encompassing lens that incorporates existing innovation components. Model of innovation 1 revealed efficiency-based, social-based, user-based, and challenge-based innovations and model of innovation 2 revealed social innovation, technology and institutional innovation. This dissertation also opens up opportunities for subsequent research on the conceptualization of innovation particularly in the context of penurious environments marked by two overarching constraints or limitations, i.e. one of resources available and two degree of institutional maturity. I have revealed, through the prism of primarily social entrepreneurs, how social entrepreneurs perceive mainstream entrepreneurs and big business to view innovation under constraints. However, the models proposed herein may be useful as conceptual frameworks to test innovation processes pursued not only by who we understand as social entrepreneurs, but also by other actors involved in innovation under constraints.

Latour and Woolgar (1979) espouse the virtues of using ethnography and photography to execute the methodological principle of 'follow the actor' (Latour 1987). Rosemary Stewart (1972) introduced the methodological focus on first-hand observations of and analysis of what managers actually do. This paved the way for micro studies of scientists and technologists in their laboratories (Latour and Woolgar 1979; Knorr-Cetina 1995; Michael 1996). This methodological approach has resulted in the emergence of the field of 'Strategy as Practice'. This micro level and first-hand approach is useful in not only revealing the kinds of work done, but also the kinds of people who do it, and the kinds of skills

involved in doing work (Johnson et al 2007). My research has focused on listening to the social entrepreneurs talk about their views on innovation orally or in writing in their business plans. I believe that this work is relevant for an understanding of models of innovation and a good starting point for future research on what social entrepreneurs actually do. The models in this study could be verified or challenged through a comparison with codes and themes generated from what really happens on the ground.

Further the particular outcome of outlining and defining models revealed in this study as "frugal innovation", can be useful in understanding a possible shift in innovation paradigm from one that has focused on technology to one the is focused on social impact, efficiency enhancing, challenge or need driven. Most innovation research under the domain of innovation over time have identified in retrospect fundamental changes in the structures of innovation systems over different time periods (Bruland and Mowery 2005). For instance, the shift from an agricultural society to industrial society to knowledge and service economy brings with it economic and social changes signalling in the way innovation paradigms evolve. We may question to what extent the shift to more social impact or value creation or shared value in economic activity is a precursor or antecedent of the evolution of new innovation paradigms? The increasing popularity of frugal innovation among both social entrepreneurs and big business raises opportunities to observe shifts in paradigms, logics and practices not in retrospect, but in the process of evolution.

The findings of this study also suggest that frugal innovation is a deliberate effort to reduce prices from the outset rather than on relying on eventual but also inefficient economies of scale. Traditionally, innovation has relied on incremental improvements in product and process and the achievement of economies of scale to reduce process for greater widespread affordability. If frugal innovations can be considered disruptive, this poses

fundamental questions about the prevalent models of innovation, such as the S-curve, which postulate the eventual "catch-up" of new disruptive technologies in terms of both performance and price. If however frugal innovations are not deemed to be disruptive, then the strategy of frugal innovators to tackle performance and price together may signal a position on the S-curve that accelerates price reduction beyond that achieved by economies of scale trajectory. Future research would have to look into the fundamental nature of frugal innovations as both disruptive as well as incremental to study the pursuit of price reduction in comparison with that in mainstream innovation models.

In closing, this work has contributed to developing models of innovation under constraints among social entrepreneurs by merging theories of resources and institutions. This study proposed based on the myriad perceptions of social entrepreneurs to innovation that we need to move beyond social innovation and recognize the use of other existing innovations, mainly technology and institutional innovation, all three of which can be captured in the emergence of a new innovation construct, i.e. of frugal innovation. And the work has suggested the development of a theory of frugal innovation by postulating propositions based on empirical analysis which can be tested in further work. My hope is that I can work with colleagues to extend this work into the direction of some of the various and intriguing avenues for future research outlined above.

Table 7.1: Summary implications of two models to theory, practice, and policy

	Model of Innovation 1	**Model of Innovation 2**
Researchers	Theoretical framework for understanding 'innovation for underserved' or social innovation; finding of drivers and sources	Theoretical framework for understanding 'innovation under constraints for underserved'; finding of frugal innovation
Practitioners	Three constraints exist in not only developing but also developed markets; innovation life cycle may go through different phases	Overlapping spaces and hybridization of innovation necessary to tackle different contextual constraints
Policy makers	Policy should help field evolve rather than focus on best practices	Involvement of different stakeholders: public, private, and civil

APPENDICES

A.1 CUREC (ethics board approval) certificate

SOCIAL SCIENCES & HUMANITIES
INTER-DIVISIONAL RESEARCH ETHICS COMMITTEE

Hayes House, 75 George Street, Oxford. OX1 2BQ
Tel: +44(0)1865 614871 Fax: +44(0)1865 614855
ethics@socsci.ox.ac.uk www.socsci.ox.ac.uk

Co-ordinator of the IDREC
Social Sciences Divisional Office

Tuesday, 8 November 2011

Yasser Bhatti
Saïd Business School

Dear Yasser,

Research Ethics Approval

Ref No.: SSD/CUREC1A/11-275

Innovation and Entrepreneurship in and for Emerging Markets - Under Institutional Voids, Resource, and Affordability Constraints

The above application has been considered on behalf of the Social Sciences and Humanities Inter-divisional Research Ethics Committee (IDREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to the IDREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly approval has been granted.

Should there be any subsequent changes to the project, which raise ethical issues not covered in the original application, you should submit details to the IDREC for consideration.

Yours sincerely,

Kerry Vernon

cc: Dr David Barron, Saïd Business School
Kate Goodman, Saïd Business School

KV/EB

A.2 Information sheet for research interview

Purpose: This research project studies how people innovate under constraints, something you know first-hand. As someone involved in the design or commercialization of solutions for the underserved, your opinions and experiences about this activity would be invaluable to me for research I am completing in "Innovation and entrepreneurship in and for emerging markets".

This phenomenon can be referred to as "frugal", "extreme" or "reverse" innovation and in formal terms, it redefines business models, reconfigures value chains and redesigns products to use resources in different ways and create more inclusive markets that serve users with affordability constraints, often in a scalable & sustainable manner. I would like to speak with you about what you actually do and notice about this kind of innovation. The findings from this research will inform scholarly theories in innovation and entrepreneurship as well as bring benefits to practitioners looking to solve the needs of consumers in demanding conditions.

The interview is voluntary and should take about 50-70 minutes. You may withdraw anytime without penalty.

Credentials: I have degrees in Mechanical Engineering and Computer Science and worked in both Engineering and IT sectors for over six years. I have launched three of my own start-ups, one of which is successfully running. Most recently I completed the MSc in Management Research from Oxford University and am now continuing at Oxford as a doctoral student. For more information on my bio and on my research, please visit www.frugal-innovation.com

Confidentiality: This project has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee. The information you provide, should you wish to do so, will be used for the purpose of data analysis for completion of the PhD dissertation, subsequent research publications in academic journals and for policy use. Please signal to me any confidential information that you would not want to appear in published form and/or where you wish the source to be made anonymous, please do not hesitate to request so.

Online Thesis Publication: The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate programme. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research.

If you agree to participate in this project, the research will be written up as a thesis. On successful submission of the thesis, it will deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published with open access for every internet user.

What if there is a problem? If you have a concern about any aspect of this project, please speak to the researcher concerned who will do his best to answer your query:
Yasser Bhatti, PhD Candidate in Management Research
Centre for Entrepreneurship and Innovation, Said Business School, Oxford University, Oxford OX11HP, UK UK: +44 7855773129 / USA: +1 631-3121711

yasser.bhatti@sbs.ox.ac.uk / yabhatti@frugal-innovation.com
If you remain unhappy and wish to make a formal complaint, please contact the Research Ethics Committee at the University of Oxford: Social Sciences & Humanities Inter-Divisional Research Ethics Committee, Oxford University, Hayes House, 75 George Street, Oxford, OX1 2BQ, UK; ethics@socsci.ox.ac.uk; +44 1865 614871

A.3 Consent Form

CONSENT FORM

Subject: Design and Commercialization of Solutions for Developing Markets
Topic title: *Innovation and Entrepreneurship in and for Emerging Markets -- Under Institutional Voids, Resource, and Affordability Constraints*
Type: Subject centred
Interviewer: Yasser Bhatti, Doctoral Candidate, Said Business School, Oxford University
Purpose: For doctoral degree research data collection – academic research
Recording: Audio recording
Confidentiality: Any or all information provided in the interview will appear in scholarly publication. You may request anonymity and/or that certain data is treated in confidence.

Authorization to proceed:

*"I*_____
have read the participant information sheet, have had the opportunity to ask questions about the research study and have received satisfactory answers to questions, and any additional details requested; and hereby give my permission for Yasser Bhatti to interview me and quote my responses in his PhD ***[dissertation], [book] or [scholarly publication]****. I waive claim on copyright to material that generates from this discussion and hereby grant permission to proceed with the interview in the form of my signature below."*

Signature: _____**Date:** _____

Anonymity / Special Requests: _____

Interviewer / Researcher:

Yasser Bhatti, PhD Candidate in Management Research
Centre for Entrepreneurship and Innovation, Said Business School
Oxford University, Oxford OX11HP, United Kingdom

UK: +44 7855773129 / USA: +1 631-3121711
yasser.bhatti@sbs.ox.ac.uk / yabhatti@frugal-innovation.com

A.4 Interview guide

- Not all questions apply

Questions	Probing points
You and your experiences	
1. What drew you to this activity?	*Background?*
2. How are you involved with this activity?	*Design, operations, funding, training?*
Context	
3. What has drawn interest to solutions for the poor?	*Why has it grown, if at all?*
4. What do you think "frugal" or "extreme" signifies?	*LDC 1 billion or EM 4 billion?*
Specific Project	
5. What is your specific project / start-up focus?	*What challenges are you facing?*
6. How does your work seek to change incumbent conditions, solutions?	*E.g., existing value chain, distribution; How do you wean away customers from current habits?*
General	
7. What makes developed market solutions useful **or NOT** in emerging market contexts?	*Probe along political, regulatory, legal, social, cultural, technology*
8. How does your approach compare with existing innovation practices?	*With whom, using what resources or approaches?*
9. How does resource availability affect the process?	*External resources or local?*
10. What skills and resources enables a solution provider to enter developing markets?	*In terms of skills, labor, material, technology?*
11. How do local norms, culture affect your efforts?	*As barrier or enabler?*
12. To what extent is the whole ecosystem considered?	*e.g. Problem of Ghana nets*
13. How does one balance cost & performance concerns?	*Compromise on one or the other?*
14. From what you have learned in developing countries how might things change in developed markets?	*What can your experiences offer to innovation in developed economies? Internationalization?*
Competencies	
In your experience, what competencies does one need to	
15. Come up with a viable solution, product/service?	*Exploration*
16. Deploy the solution?	*Commercialization; How do you measure success?*
You may want to break the competencies down to those needed for the	
17. The innovator?	*Focus on elements in process, rather than roles.*
18. The entrepreneur?	*How will they make resources available?*
19. The organization?	*Structure, flexibility, training, scale up, partnerships, professional managers*

Special conditions that may affect the interview:
Observations, feelings, interpretations, concerns, follow-up, etc
Other Questions

A.5 Pilot stage interview guide

Questions	Probing points
You and your experiences	
1. Please describe your educational background?	
2. What are you doing now?	Title, job, further studies, etc. part of the world
3. What drew you to solving developing market needs?	
4. How are you involved with frugal innovation?	What do you think "frugal" signifies?
Innovation	
5. What is your project/startup/design focus?	What specific problem(s) are you looking at?
6. What are the incumbent conditions, solutions?	E.g., existing value chain, distribution
7. How does your work seek to change this?	How do you "unlearn"?
8. Please describe how you formulate solutions?	How is this innovation? What, with whom, using what different resources or approaches?
9. How does this compare with other innovation processes in this same project area?	Or with innovation in other areas?
Competencies	
In your experience, what competencies do you need to	
10. Design a product/service?	What is involved in 'design' part of the activity? What is the 'context" or ecosystem?
11. Commercialize or deploy the design?	What is involved in 'commercialize" or "deploy"?
You may want to break the competencies down to those needed for the	
12. The innovator?	Focus on elements in process, rather than roles.
13. The entrepreneur?	What are the key resources you need to implement your innovation? How will you make these available?
14. The organization?	Structure, flexibility, training, **scale up**, partnerships, professional managers
Context	
15. How do you perceive the growing or diminishing interest in solutions for the poor in developing markets? Why?	What motivates you?
16. What makes developed market solutions useful **or NOT** in emerging market context?	Probe along political, regulatory, legal, social, cultural, technology
17. From what you have learned in developing markets how might things change in developed markets?	What lessons can your project bring for innovation in developed economies?
18. Do these solutions have scope for internationalization?	

Special conditions that may affect the interview:
Observations, feelings, interpretations, concerns, follow-up, etc
Other Questions

A.6 External validity and generalization test from research site B

In this appendix I reveal findings from a second community of social entrepreneurs which is similar in contextual characteristics to the main research community used to reveal findings outlined in chapters 4 and 5. I use this as an opportunity to perform an external validity and generalization test of the findings and models proposed. Based on interview data from this second community of globally networked social entrepreneurs, I hint towards a notion of corroboration and generalization.

Although the intent of qualitative studies is not to infer or generalize findings from a sample to a population, we can attempt to investigate whether the findings also apply to a sample that is similar in nature. The second community, research site B, from which interviews were collected was the Design for Extreme Affordability programme at Stanford University. Physically it is only about half an hour drive from the main research site, the GSBI programme at Santa Clara University. The two communities enjoy similar features as outlined in chapter 3 and depicted in figure 3.1.

At the core of the programme is the interdisciplinary university course hosted at the Design School at Stanford University. Since 2003, 325 students from all seven schools within Stanford have worked on 80 projects in 14 countries (Extreme 2013a). The class cohort is both demographically and discipline wise diverse and works with global partners that help to make all participants in the programme "globally networked". Fundamentally however, the two communities are different in the sense that the entire GSBI cohort is formally recognized as social entrepreneurs by the inducting institution while the members of the Stanford cohort are not all formally recognized as social entrepreneurs. Of the eleven I interviewed, half have gained formal recognition through various awards, competitions, and inclusion in social

enterprise networks such as the Skoll World Forum, while the other half have been described as social entrepreneurs in media, books, and blogs. The course website explicity states that: "*Topics include user empathy, appropriate technology design, rapid prototype engineering and testing, social technology entrepreneurship, business modeling, and project management*" (Extreme 2013b). For these reasons, I argue that I am able to characterize the course graduates as "social entrepreneurs" who are "globally networked", as is the case with members of the GSBI community.

Through eleven interviews from research site B, I sought to determine if the coding template and models of innovation revealed in chapters 4 and 5 also hold true among respondents from this second community. Again, the intent is not to generalize the coding scheme and subsequent models of innovation to all social entrepreneurs, but to investigate whether the same themes can be found in a sample which is very close contextually in nature to the original sample.

From the eleven interviews lasting 696 minutes or 11.60 hours, I extracted 372 passages of interest that amounted to 23,350 words of data. As per the technique of template analysis described in chapter 3, extracts from the data were plugged into the coding templates for both research question one and then questions two and three. For research question one "How do social entrepreneurs conceptualize innovation?", 109 passages fitted into the different conceptions of innovation among social entrepreneurs (table A6.1). Almost twice as much data fell into social-based innovation (35 passages) and challenge-based innovation (32 passages) than efficiency-based innovation (19 passages). User-based innovation was supported by 23 data passages. Sample quotes for each of the conceptions of innovation are outlined in tables 6.3a through 6.3d. Given that efficiency-based innovation is associated with

innovation by large firms, it is expected that the respondents here who represent mostly startups, talked and referred to efficiency-based innovation with the least focus. Also, the first order construct of "stay ahead of competition" did not attract any support from the data. Despite this limitation, and the limited number of interviews from research site B, there does seem to be substantial support for the coding template of research question one and the subsequent model of innovation 1 outlined in chapter 4.

TABLE A6.1: Number of passages coded for RQ 1 through research site B

	Number of passages
User-based	23
Efficiency-based	19
Social-based	35
Challenge-based	32
Total	**109**

For research questions two and three "How do social entrepreneurs conceptualize innovation under a) resource scarcity and under b) institutional voids?", data from research site B supported the finding of institutional innovation through 173 passages, technology innovation through 170 passages, and social innovation through 141 passages (table A6.2). What was surprising, despite the limited data used for this generalizeability test, was that the linkages depicted in table 5.3 that helped to create the model of innovation 2, were also supported by the respondents' quotes. Table 6.4 lays out supporting data for both the intra-dimensional linkages that refer to constructs within the same third level dimension as well as inter-dimensional linkages that refer to cross and overlapping notions of third level dimensions. This suggests the model of innovation 2 has potential to be generalisable across social entrepreneurs beyond the GSBI research site A from which it was revealed.

TABLE A6.2: Number of passages coded for RQ 2 through research site B

	Number of passages
Institutional innovation	173
Technology innovation	170
Social innovation	141
Total	**484 ***

***Note: Not mutually exclusive**

Another interesting new finding from analysis of data from research site B was the possibility of a new construct of "reverse engineering" that was supported by four quotes from three of the respondents. Reverse engineering as a means of dealing with resource constraints in technology innovation was not revealed in analysis of data from research site A. This suggests that the recognition of generalizeability argued here, although plausible, should be viewed with caution as each community of social entrepreneurs can have idiosyncratic conceptions of innovation. Nevertheless, based on tables 6.3a,b,c,and d and 6.4, the core coding templates generated in chapters 4 and 5 do seem to hold up to a degree that enables extending the theoretical findings to other contexts involving social entrepreneurs who are globally networked.

TABLE A6.3a: Data from research site B supporting conception of innovation in RQ 1 (user-based) – 23 passages

By whom	By grassroot individuals: • *But they are very nimble, flexible, and grassroots, which is very good for the objective. Which is to create the system and make it sustainable. (B9E)*
For whom	For underserved: • *Underserved communities are well suited to enhancing learning opportunities in colleges. They offer an empty space on the chessboard where no one is competing and expectations of perfection are fewer. For profits serve generally those who have money. (B11F)*
For what	For solving needs: • *We train them for six months, to develop designs that would satisfy local needs, as well as businesses to take those solutions to the community. The fellows who come to our centres, they do the design and business development, we coach them. (B4E)*
Economic orientation	No profit motive: • *We didn't go for commercialization because we wanted the people to uptake the product, and this was easiest done through our non-profit partner. (B8E)*
Nature of solution	Making do: • *Yes I believe jugaad is improvisation here in India. But for me I was introduced to improvisation through the performing arts, through theatre actually. I feel it is a necessary attitude, but it is not a sufficient one. I feel there is a lot lacking for innovation in India. People do have wonderful sense of improvisation. It means they can make do, they can come with solutions which are stop gap, very fast. But to reach a level of finesse in design, we don't see that here. At least for those people who gone through this program, for them to realize, what does it mean to develop a product in a rigorous way, to develop a business venture. (B4E)*
Necessity based	No attainable solution: • *There are many solutions out there but they are either inaccessible or not affordable. (B7E)*
Ideational	No data
Scalability	Little scaling: • *To some extent they may be satisfying local needs, that is the sense of jugaad that comes in. If you look at the National Innovation Foundation, they have a whole database of what they call grassroots innovations. But at the same time you see very few of these scaling up to the national scale or to the mass market. (B4E)*

TABLE A6.3b: Data from research site B supporting conception of innovation in RQ 1 (efficiency-based) – 19 passages

By whom	By large firms: • *Some of the students - a mix of would-be MBAs, engineers, and designers - truly are do-gooders, but a fair number think building good, cheap products is a skill any corporation would value. ""General Electric is not dumb - it looks at these markets too,"" says Seth Silverman, a civil and environmental engineering graduate student in the class who focuses on technologies for Ethiopia. ""But these environments are so hard to work in that its attention is spent elsewhere. We can fill that gap, with an approach that goes beyond a fast profit motive."" http://money.cnn.com/2009/04/01/technology/copeland_developing.fortune/ (B11F)*
For whom	For underserved: • *"Fortunes have been made on the back of that cellphone business," says Bill Reichert, managing director of Garage Technology Ventures. "A decade ago you wouldn't have imagined you could target these populations, but there is real business opportunity in introducing the right technologies." http://money.cnn.com/2009/04/01/technology/copeland_developing.fortune/ (B11F)*
For what	For cost leadership & competitive advantage: • *So the D Light people are trying to get some components from China, like LEDs and batteries. The root thing is having the low cost components available. And the reason they are low cost is that they are able to sell millions of them, volume drives down the price, and competition between different manufacturers. But the design themselves use commodity products and fit them to a developing context. (B2E)*
Economic orientation	For high profits: • *Whereas a company always has to think about their profitability and their bottom line or else they are not going to be able to do. So when you are at school you don't need to think about that. (B3E)*
Nature of solution	Good enough: • *I think when you are trying to cut cost as far as possible, you understand that you may only design it to last 3 or 5 years. But if I were to design it here without consideration of cost, I could design it to last 50 years. And so you understand that compromise if you want them to afford it at a desired price-point. (B1E)*
Necessity based	Stay ahead of competition: • *No data*
Ideational based	Not data
Scalability	High scalability: • *What would be interesting is that if there is a competitor because that means there is more market penetration which is good for the service to the people. Right now we have to worry about getting the service to 90% penetration. So if there is competition, that would be easier to achieve. (B9E)*

TABLE A6.3c: Data from research site B supporting conception of innovation RQ 1 (social-based) – 35 passages

By whom	By entrepreneurial actors: • *I've never thought of myself as very entrepreneurial until I began confronting these problems. In Haiti, in the developing world, where I found myself confronting so many problems that needed fixing, is where I had to move out of my comfort zone. (B9E)*
For whom	For underserved: • *In my sector 2.6 billion don't have access to sanitation and 1 billion don't have access to clean water. So those are the underserved. However, there are 40 million in US who do not have health insurance. But I guess the demographic changes on the need you define. I define the underserved as those individuals who don't have access to life supporting services. There are fundamental rights which allow you to live in a society, healthcare, education. (B8E)*
For what	For social improvement: • *I was drawn to this for the interesting problems but also the opportunity to have impact on peoples lives. (B7E)*
Economic orientation	For profit / non profit: • *One of the things different in the entrepreneurial aspect is that we ourselves aren't aiming to make money. So we are a non profit as an organization but want to make it possible for our clients to be for-profit in Ethiopia. (B1E)*
Nature of solution	Surpass expectations: • *One thing we became aware of in the US is that some of the specifications we have here are made possible because we have climate controlled hospital environments, which are very sterile, and there are all these additional variables which in theory would require a much high quality product to be successful in Bangladesh. So you need much higher specifications for extreme affordability than here in the US. And that is what requires a lot of creativity, to have higher expectations but design at much lower price-points. (B5E)*
Necessity	No data
Ideational based	Rectifying inequity: • *I've worked many years in water and sanitation and witnessed the disparities in access to this as I travelled around the world. The distribution of these resources is rather unethical. So I felt that given I have access to amazing resources, that I felt it compelling to assist others have access to these resources. I originally started to work on low income clinics in US. (B8E)*
Scalability	Ambition to scale: • *They started out working on a very small, few thousand people, community. This was their test bed before they could expand. (B7E)*

TABLE A6.3d: Data from research site B supporting conception of innovation RQ 1 (challenge-based) – 32 passages

By whom	By designers: • *It seemed there was a lot of low hanging fruit (in developing countries) that could and should be changed... throughout my time at Stanford I came to realize that a lot of the low hanging fruit has to do with design changes rather than policy. Policy seemed too slow for me. (B3E)*
For whom	For underserved: • *Whereas, if you go with an underserved population as your context in which to do projects, actually, by definition, there is plenty of space to come up with something that is brand new and has a chance to really make a difference...By aiming at underserved populations, which are not that hard to find, once you start thinking about that, it's not that hard to do it. http://specimenmagazine.org/wp-content/uploads/2012/11/Patell_Interview.pdf (B11F)*
For what	For challenge: • *It is not a resource problem, it is about the process of right mindset, mentality, and culture that is amenable to do this, and all this is abundant here at Stanford. And that mentality is of doing something that is just possible, no matter how unreasonable. So for someone who takes it more as a challenge and has the skills, will figure out a way to do it. Seeing constraints as an opportunity. (B6E)*
Economic orientation	Reasonable profits: • *Sam Goldman, founder of DLight presented to us and said we can sell these lights to very poor people and make a profit, and sustain a for-profit company. And we can do both, be fully sustainable and make an impact in the lives of very poor people. (B6E)*
Nature of solution	Radically improve some performance dimension or lower cost: • *Our DRev device for prenatal jaundice exceeds US standards. Because of its good quality and low cost, we may see Brilliance adopted even in US hospitals. (B11F)*
Necessity based	No data
Ideational based	Design breakthroughs: • *There is an opportunity again to leapfrog, looking at problems and trying to decentralize infrastructure, as we are doing in Haiti. So I am looking at decentralized resource recovery centres as part of an existing sewer network. Like Stanford uses a lot of water to irrigate, which doesn't have to be pristine mountain water from Yosemite. And that is going to become more and more expensive over time. This means we will need to create more resources. (B9E)*
Scalability	Proof of concept: • *It is hard to separate myself form the resources I have access to in the US. But we need to work with manufacturers in Ethiopia to be able to gain capital to manufacture the product. One of the biggest investments would be the tools needed to manufacture the pepper grinder, such as dies. So it would be a big challenge. But we would have to prove it for someone in Ethiopia to invest in manufacturing this. (B1E)*

TABLE A6.4: Data from research site B supporting RQ 2 & 3 findings and linkages in support of model 2

First order construct	Second order theme	Third level dimension	Quotation
		Intra dimensional	
Awareness & Advocacy **Link A in table 5.7** Distribution	Boundary Issues Access Provision	Institutional Innovation (soft) ↕ Institutional innovation (hard)	*That is an attractive thing in Mexico, the partner we talked to has connections with the government. They have doctors who go out to the rural communities, and give out medicines for free. And we think it would be good if we can make a contract with the government to use this and push this product to the local doctors who will basically educate the users and sell the products. So yes, they will advocate to the users and give out samples so when the users go to mom and pop stores they can make that connection. (B10E)*
(De)sophistication Servicing	Provide Satisfactory solution Scope of Solution	Technology innovation ↕ Technology innovation	*It is really very simple product. In designing, when we prototyped it we asked our partner if this type of tube or steel is widely available in Cambodia. We used a drive chain, bike chain, we figured out what types of chain, types of gears are commonly available. So it was a back and forth process of making sure the things we were incorporating into the design were widely available. Everyone rides bike, there is always a bike repair place on every corner, so we definitely kept that in mind. (B3E)*
Economic Sustainability Scaling	Develop Capabilities Reach out	Social innovation ↕ Social innovation	*Jaipur foot can only help a limited number of people through charity, giving away prosthetics. What about the 1001th or 1002nd person that needs it but they run out of free prosthetics. Charity does no scale and we are striving for economic sustainability and scale. (B11F)*
		Inter dimensional	
(Un)structured **Link B in table 5.7** Design	Build structures Scope of solution	Institutional innovation ↕ Technology innovation	*It seemed there was a lot of low hanging fruit (in developing countries) that could and should be changed... throughout my time at Stanford I came to realize that a lot of the low hanging fruit has to do with design changes rather than policy. Policy seemed too slow for me... Low hanging fruit to me is something that you can notice in a new environment pretty early on something that isn't necessarily being done in the most efficient way or noticing something that is just wrong but there is nothing being done to fix it…. I think what goes along low hanging fruit, part of it is that ... are there people who care enough to work on those challenges. I think that is what extreme affordability is so good at doing is bringing talented designers to those issues. (B3E) (B3E)*
Improve efficiency **Link B in table 5.7** Awareness & Advocacy	Improve performance or efficiency -- Boundary issues	Technology innovation ↕ Institutional innovation	*So part of the problem we are trying to address is to make hospitals feel like this is a very cheap solution, but it is more efficient, and we can do it even in a resource constrained context. (As opposed to belief now) It doesn't just have to be in an urban hospital. (B5E)*
Design	Scope of solution	Technology	*So the need finding exercise is part of the design process and when we realized this need we changed*

Link C in table 5.7 Needs	Resolve needs or meet aspirations	innovation ↕ Social innovation	*our project focus. (B1E)*
Improve efficiency **Link C in table 5.7** Affordable	Improve performance or efficiency Reach out	Technology innovation ↕ Social innovation	*So our requirements for our solution was for something small, could be manufactured for low cost, and gave us a continuous processing with low effort and reduced the amount of contact with the peppers. (B1E)*
Self sufficiency & Affordable **Link D in table 5.7** (G)localization	Develop capabilities & Reach out Boundary issues	Social innovation ↕ Institutional innovation	*By making it affordable you increase the chances of achieving self sufficiency for the cause. And this price reduction is independent of whether you do it locally or not. (B11F)*
Capacity building **Link D in table 5.7** Distribution	Develop capabilities Access provision	Social innovation ↕ Institutional innovation	*The other thing that is possible is to find existing coop structures, so in certain regions governments work with coops to help them get off the ground. They teach them how to do the kind of organization of the coop, leadership, skills on projects to help generate income for the coop. So if we could work with the government on such projects we could get our product delivered through them. This would be the softer approach to distribution. (B1E)*
Learning **Link D in table 5.7** Distribution	Develop capabilities Access provision	Social innovation ↕ Institutional innovation	*So we spent a while to see if we could do the same with prosthetics. We didn't learn very quickly, and it took us a while to realize that lighting and prosthetics are not comparable markets, the former is several orders of magnitude a larger market. From a business perspective, this is a terrible business to be in. First of all BOP market, then we take a very small slice of the BOP -- disabled, then take a small slice of disabled -- amputees, and then specific types of amputees who happen to be in rural areas far away from the medical device distribution chain. And we are just one component of a costly system. Even if you figured out the distribution charges for delivering a knee to someone in rural India, where you have to build some infrastructure, you need to train people, setup clinics, there have to be other components at comparable cost, of which Jaipur Foot has figured out on their own, but they are an exception, and all this just balloons in complexity of scaling. (B6E)*
Scaling **Link D in table 5.7** (Un)structured	Reach out Build structures	Social innovation ↕ Institutional innovation	*You need someone who is Ethiopian and can manage the bureaucracy there. To get something of that scale, you would need to deal with that. (B1E)*
Capacity building **Link D in table 5.7** Partnership	Develop capabilities Build structures	Social innovation ↕ Institutional innov.	*There is one group I would really like to partner with. There are two orphans who learned from this Swiss guy who supported an orphanage and they have plenty of capacity to do good engineering. They use the workshop also as a vocational school for people to teach manufacturing skills. (B1E)*

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