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EXPLORING THE CREATION AND EVOLUTION OF ICT FOR DEVELOPMENT INITIATIVES IN INDIA: ISSUES OF SCALING THROUGH BRICOLAGE, BUSINESS MODEL DESIGN AND INCLUSIVE INNOVATION

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Dedicated to my parents,

especially to my father

मेरे माता-पिता को समर्पित

Abstract

This dissertation investigates how organizations (specifically social enterprises) create and implement information and communication technologies for development (ICT4D) projects for the people at the bottom of the pyramid (BoP) and how such initiatives achieve scale. Building upon the case of mobile money in India, it explains how organizations develop ICT4D projects for the BoP, and explores the issues of business models, inclusivity and scaling in such projects.

It is based on data collected from two organizations, one with operations mainly in rural areas and the other one in an urban setting. These organizations which primarily target marginalized communities, operate in a strictly regulated market, and face initial resource challenges. The data is collected from multiple sources, including interviews and archival material such as organizational records, annual reports, and formal project reports.

Following the introductory chapter, the dissertation comprises three related papers. The first explains how social enterprises that have both a social and a profit mission, provide ICT-enabled services to the people at the BoP and achieve scale. It discusses how ICT social enterprises employ different forms of bricolage to cope with resource challenges and regulatory constraints, and scale up. The second paper examines the role of business models in providing ICTs to the BoP and discusses the key components of such business models. It proposes that in addition to the previously discussed value proposition, value architecture and value finance components, innofusion network and value co-creation are also crucial components of such business models due to the specific characteristics of the BoP communities. The final paper of this dissertation theorizes the role of inclusive innovation (an emerging form of innovation in low income markets) in enabling development for

marginalized communities. Taking into account 1) the role of micro financial institutions in rural areas and 2) the rapid proliferation of mobile technologies, it examines the ways in which micro financial institutions leverage mobile technologies to facilitate inclusive innovation in marginalised communities, specifically rural women.

The dissertation offers contributions to theory and practice. First, by investigating bricolage, it provides useful insights into understanding aspects of scaling for ICT social enterprises, particularly in resource constrained and restrictive environments. Second, it discusses the particular importance of business models for the BoP. Given the specificities of BoP communities, I propose five key dimensions of business models that are appropriate for delivering ICTs. Extending this, the third paper also proposes contributions to the emerging field of inclusive innovation and provides a novel way to understand innovation in marginalised communities. The dissertation also provides practitioners (that deal with BoP communities) useful insights into the ways in which they might structure their operations and revenue models, and deal with the partners they could engage with to expand and scale. Finally, this dissertation argues for more focus on marginalised communities such as women in rural areas that have received limited attention in IS research.

Keywords: Information and communication technologies, Bottom of the pyramid (BoP), Business models, Bricolage, Scaling, Inclusive innovation, Mobile money, India

Résumé

Cette thèse de doctorat explore comment les organisations aux ressources limitées mettent en œuvre des technologies de l'information et de la communication (TIC) au service des populations en difficulté, en examinant les différents modèles d'affaires et d'innovation inclusive existants. Pour cela, cette thèse s'appuie sur des données qualitatives recueillies à partir d'entretiens semi-structurées, de visites sur le terrain en Inde et de documents d'archives.

Ce projet de recherche est composé de deux études empiriques.

I- Une étude de cas portant sur le déploiement d'un projet permettant de lutter contre l'exclusion (ICT4D). Le projet ICT4D est dirigé par Alpha India Financial Services, une start-up basée en Inde.

II- Une étude de cas réalisée chez Cashpor, une Institution de Microfinance (IMF) basée en Inde.

Les articles 1 et 2 sont basés sur le projet ICT4D développé par l'organisation Alpha tandis que l'article 3 utilise le cas Cashpor. Cette thèse de doctorat se compose des trois articles suivants:

Article 1: Technologies de l'information et de la communication (TIC) dans des environnements à ressources limitées: le bricolage est-il une solution pérenne?

Article 2: Fournir les TIC au les populations vivant "au bas de la pyramide" (BoP): une recherche de modèles d'affaires appropriés

Article 3: Innovation inclusive à travers les technologies mobiles : aperçus des micro-institutions financières.

Cette thèse de doctorat s'appuie sur des données recueillies à partir d'entretiens semi-structurés, de visites sur le terrain, et d'études archives. J'ai effectué au total 70 entretiens (10 en phase exploratoire avec des experts de terrain et 60 en phase de confirmation) avec 43 informateurs. Cela a été complété par des conversations informelles avec des experts qui ont eu lieu tout au long de ma période de recherche. Ce travail de recherche est interprétatif dans le sens ou le processus d'acquisition et d'interprétation des données a été acquis via des constructions sociales, c'est-à-dire le langage, des significations partagées, des documents, des outils technologiques, et des artefacts (Klein et Myers, 1999).

Cette dissertation apporte des contributions importantes à propos des modèles d'affaires pour les communautés au "bas de la pyramide" (BoP). Cette thèse contribue en effet à l'identification de 5 dimensions clés de modèles économiques qui pourraient être considérées comme appropriées pour fournir les TIC au PoB. En extension à l'étude d'Al-Debei et Avison (2010), cette thèse propose de considérer le réseau de valeurs comme un réseau d'innofusion et suggère d'ajouter une nouvelle dimension de co-création de valeur.

Adoptant la perspective émergente de l'innovation inclusive, cette thèse de doctorat identifie également des façons dont les IMF tirent parti des technologies mobiles pour favoriser l'innovation dans les communautés rurales. Cette thèse souligne que l'innovation inclusive nécessite un réseau d'intermédiaires et d'infomédiaires. En particulier, avec les apports des moyens de subsistance des actifs, cette recherche démontre que l'innovation inclusive (par les technologies mobiles) entraîne un changement de statut des actifs (par exemple, par substitution d'actifs, modification d'actifs, combinaison d'actifs et échange d'actifs). Il soutient en outre que les systèmes d'innovation inclusifs doivent mettre en place des mesures d'incitations progressives et appropriées. Cette thèse souligne également le rôle des pratiques informelles pour les systèmes d'innovation inclusifs.

List of papers presented

1) Research Seminar, Judge Business School, Cambridge, June 2015. Presentation on the project: Title: *The curious case of mobile money platforms: where the strong do not always win*.
2) 20th Americas Conference on Information Systems, Savannah, August 2014. Aakanksha Gaur, David Avison, and Julien Malaurent. Title: *Together we will find a 'Jugaad': Resource bricolage in the Indian mobile payments sector.*
3) 13th International Conference on Social Implications of Computers in Developing Countries, Sri Lanka, May 2014. Aakanksha Gaur and David Avison. Title: *Women and ICT enabled well-being: Inclusive innovation by micro financial institutions in India.*
4) 3rd International Cashless Society Roundtable, Stockholm, May 2014. Aakanksha Gaur, Julien Malaurent and Fergal Carton. Title: *Creating a network of human automated teller machines: The business correspondent model for mobile payments.*
5) 3rd Indian Academy of Management, IIM Ahmedabad, India, December 2013. Aakanksha Gaur, David Avison, and Jan Ondrus. Title: *Mobile merchandising: Exploring new business practices in the mobile payment ecosystem*.
6) 26th Bled e-Conference, Bled, Slovenia, June 2013. David Avison, Zaheer Shaik, Julien Malaurent, Aakanksha Gaur, and Reza Mousavi. Title: *The supervisor-student relationship: The problem of conflicting 'mixed metaphors'.*
7) 14th International Conference on Electronic Commerce, Singapore, August 2012, Aakanksha Gaur and Jan Ondrus. Title: *The role of banks in the mobile payment ecosystem: A strategic asset perspective.*

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List of abbreviations

ANM: Agent Network Manager
ASHA: Accredited Social Health Activist
BC: Business Correspondent
BM: Business Model
BoP: Bottom of the Pyramid.
CSP: Customer Service Point
FMCG: Fast Moving Consumer Goods
ICT: Information and Communication Technologies
ICT4D: Information and Communication Technologies for Development.
Km: Kilometres.
NGO: Non-Governmental Organization
NFA: No-Frills Account
NPCI: National Payments Corporation of India.
MFI: Micro Financial Institutions.
MNO: Mobile Network Operator
MoP: Middle of the Pyramid
M4D: Mobile for Development.
PMJDY: Pradhan Mantri Jan Dhan Yojna (Prime Minister Public Money Scheme).
POS: Point of Sales.
RBI: Reserve Bank of India.
SBI: State Bank of India
SHG: Self Help Group
US$: US Dollar
VP: Vice President

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Aakanksha GAUR

Cergy, August, 2016.

1. Introduction

This dissertation explores how organizations facing resource constraints and operating in strictly regulated markets implement Information and Communication Technologies for Development (ICT4D) solutions for the Bottom of the Pyramid (BoP) communities and how such organizations expand and achieve scale. In addition, the dissertation also examines the issues of business models and inclusive innovation in providing ICTs to the BoP. It employs qualitative data collected from semi-structured interviews, field visits, and other archival evidence. This research project comprises two empirical studies.

I- A case study looking at the roll out and expansion of an ICT4D project led by Alpha India Financial Services, a start-up based in India.

II- A case study conducted at Cashpor, a Micro Financial Institution (MFI) based in India and one of the partners of Alpha.

Papers I and II draw on the Alpha case while Paper III uses the Cashpor case. The papers are as follows:

Paper I: Scaling ICT social enterprises in resource challenged environments: Is bricolage the solution?

Paper II: Delivering ICTs to the BoP: The quest for appropriate business models

Paper III: Inclusive innovation through mobile technologies? Insights from micro financial institutions.

The dissertation includes an empirical investigation conducted with Alpha India Financial services, a start-up that provides mobile banking services to the people at the BoP in parts of India. Alpha operates in an environment characterised by competition and resource constraints. Despite the challenges of operating in BoP markets and the resource constraints it faced, the company achieved scale and is now an established player in the mobile money sector in India. This is particularly important as most mobile money schemes launched in developing countries have not succeeded and, as a result, only a small proportion of such populations uses mobile money.

Paper I, entitled, "Scaling ICT social enterprises in resource challenged environments: Is bricolage the solution?", focuses on exploring how the company achieved scale. Alpha represents a case of an ICT social enterprise that is enterprise-oriented and has both a social and a business goal. The paper discusses how the company initially faced constraints related to financial and human resources and how it dealt with these challenges. The paper also discusses a number of innovations in products and processes that the company pioneered over time and shows how these innovations were essential for scaling. The study also suggests that equally important is the role of Alpha's partners and the partner network that proved to be central to Alpha's scaling. A number of innovations in service delivery were introduced by the partner firms. This study explores the key phases involved in the scaling process and argues that it consists of embedded phases of de-scaling and re-scaling.

While Paper I focusses mainly on the locus of activities within Alpha, Paper II, titled: "Delivering ICTs to the BoP: The quest for appropriate business models" considers the dyadic relationship between Alpha and its partners. Paper II explores how Alpha and its partners co-create value for each other and their clients. It shows that value co-creation is imperative to deliver ICTs in BoP communities, especially because these markets face

problems emerging due to poor infrastructure and weak institutions. Thus, to overcome these barriers, organizations such as Alpha rely on business models that are based on value co-creation with its partners. Paper II discusses the dimensions and elements of business models appropriate to deliver ICTs to the BoP.

Papers I and II consider the role of Alpha as the lead firm, while Paper III "Inclusive innovation through mobile technologies? Insights from micro financial institutions." focuses on its partner, Cashpor, an MFI based in Varanasi. Papers I and II build upon data collected in Delhi and thus their focus is on urban and semi-urban areas. Paper III, on the other hand, incorporates data sources based in rural areas of India (Pandeypur, a village in the outskirts of Varanasi). The rationale behind Paper III is partly to provide a balanced representation of rural and urban areas in the dissertation as a whole. Paper III thus reflects upon the rural settings and examines the role of mobile technologies in enabling inclusive innovation by MFIs. The paper scrutinizes the role of inclusive innovation in enabling development for marginalised communities and as such it focusses on rural women. Paper III shows the importance of social mission, accessible and affordable products to ensure a participatory innovation process which is demand driven. Critical to this is the need to infuse several innovations in products and processes by including marginalized groups in the design and development of services.

The rest of this introductory chapter is as follows. We next present the personal and academic motivations for undertaking this specific line of enquiry. This is followed by discussion of the Indian research context and the two case firms: Alpha and Cashpor. This section also discusses the specific characteristics of the research setting, the mobile money sector in India. Subsequent to this section, we provide a detailed overview of the epistemological stance and the research methods adopted. The final section presents an overview of the three research

papers that form the main part of this dissertation. The three research papers are presented in chapters two, three, and four. Chapter five discusses the theoretical and practical contributions of this research, along with its limitations, and it also discusses the potential for related future research.

1.1. Personal motivation

At the start of my Ph.D. project phase I was particularly curious about ICT for development (ICT4D) as it was particularly applicable to my home country India. I started my journey with a preliminary inquiry into the status of Aakash, the world's cheapest tablet manufactured in India. My initial idea was to inquire whether Aakash would diffuse into the poor communities. Curious about this issue, I delved further into the vast area of ICT4D and was disappointed to find that most ICT4D projects fail to achieve scale and grow. Intrigued by this issue of failed ICT projects I searched for successful cases of ICTs in developing countries and discovered the case of M-Pesa, the Kenyan mobile money system. I further researched potential similar solutions in India and realised that many initiatives were occurring in the Indian mobile money sector as well. However, the development of activities was slow and many initiatives failed to grow and achieve scale. My research showed that the key challenges were regulatory constraints, certain cultural issues (for example the presence of multiple languages that impede the roll out of a nationwide solution) and the fact that in the Indian context organizations that provide mobile money services are required to partner with existing banks.

Established organizations such as Nokia money rolled out mobile money in August 2009 as a service that enabled users to send money to friends and do bill payments through their mobile phones. However, the company failed to achieve scale and it closed operations in 2012

(Perez, 2012). There were few cases that witnessed growth in their businesses. Thus, my primary motivation was to study successes, particularly those impacting positively on the bottom of the pyramid (BoP) so that the findings and insights generated could help other firms addressing the BoP in similar contexts. One such organization is the case firm of this dissertation, Alpha India Financial Services (a pseudonym).

I first contacted the head of mobile payments at the National Payments Corporation of India (NPCI). Then, I went to Mumbai and following initial discussions was introduced to other potential respondents. I also took part in the mobile payments experiments that were going on at that time (2013) at the Indian Institute of Technology (IIT Mumbai). I followed the chain of contacts (through NPCI) to identify and accumulate critical cases in mobile money services. Many organizations were involved in providing mobile money services, primarily FINO, Oxigen and the case firm (Alpha India Financial Services). While FINO and Oxigen worked with technologies such as smartcards, internet and Point of Sales (POS) devices, Alpha's system worked on a mobile phone as basic as a Nokia 1100 and each transaction was akin to making a missed call (requiring users to have only number literacy). The sheer simplicity of the transactions caught my attention in the context of applications for BoP users and I then contacted Mr. Sinha, co-founder and CEO of Alpha who kindly introduced me to the people at NPCI. Later, I formally contacted him again over email through an official communication explaining my research objectives. His positive response to my research activities enabled me to carry out my dissertation case studies.

1.2. Academic motivation[1]

ICT4D began to gain the attention of both researchers and practitioners in the 1980s. It is an "*interplay of three aspects: information, technology and development*"(Heeks, 2007). The development aspect refers to a myriad of issues such as well-being, better quality of life, empowerment, equality and poverty reduction. According to the World Bank, more than US$37 billion was invested between 1997 and 2007 in 400 small scale ICT projects aimed at enabling social and economic development of the BoP communities (InfoDev, 2007; Lin, Kuo, & Myers, 2015).

Some research has documented ICT4D projects in India that failed to achieve anticipated benefits (Corea, 2007; Thirumavalavan & Garforth, 2009). These include the geographical information systems introduced by the Indian Ministry of Environment and Forests for forestry management (Heeks, 2002) and telecenters for agricultural development in rural India (Thirumavalavan & Garforth, 2009). Poor management, resistance to change, and complex power structures are some of the factors responsible for these failures (Silva and Hirschheim, 2007). Thus, it is often socio-economic and socio-cultural issues, rather than technology issues that cause ICT4D initiatives to fail (Tanner & du Toit, 2015).

Some IS scholars have suggested that the high failure rate of ICT4D projects is due to a lack of understanding of diverse socio-economic settings (Avgerou, 2008; Walsham, 2012). Other challenges hindering the development and implementation of ICT-based products in the developing world include high cost, low return and high risk of investment, and a lack of

[1] Parts of this section are taken from the conference paper published in proceedings of 13th International Conference on Social Implications of Computers in Developing Countries. Title: Women and ICT enabled well-being: Inclusive innovation by micro financial institutions in India

adequate infrastructure (Touray, Salminen, & Mursu, 2013). Due to these challenges, many ICT4D projects fail to grow and achieve scale. Scaling is a critical problem in the field of ICT4D projects and more particularly for enterprises that have a social as well as economic mission. Such organizations (called ICT social enterprises) are now actively involved in providing ICTs to enable development for people at the BoP.

The BoP is the largest socio-economic marginalized group of 4 billion people who live on less than US$2 per day (Prahalad & Hart, 2002). In 2012, this benchmark of US$2 was revised to consider the nominal value of US$ in 2010 and BoP now refers to individuals with "less than US$4 per day" of household income (Unitus, 2012b). In addition, the definition of BoP has been broadened to include individuals marginalized because of income, race, religion, gender, sexual orientation, disability and location.

In countries such as India, where there exist significant discrepancies between urban and rural areas, different yardsticks for income levels are adopted to categorize individuals as BoP. Thus, in urban areas of India, where the cost of living is higher, BoP individuals have an annual household income of less than 300,000 rupees (the Indian currency). This is equivalent to less than 25,000 rupees monthly household income (Unitus, 2012a). In rural parts of India, I consider BoP to have an annual household income of less than 160,000 rupees (Unitus, 2012b). This is equivalent to less than 13,333 rupees' monthly household income (about US$200).

Thus, the BoP is not a homogenous market and one set of innovations might not serve the whole of the BoP. This aspect makes scaling even more problematic for BoP markets. In addition to the challenges associated with achieving scale, the critical challenge of developing appropriate business models to deliver ICTs to the BoP has resulted in many ICT

projects being labeled as “dead pilots” (De Boer, Steen, & Posthumus, 2013; Thapa & Saebo, 2011). BMs for serving the BoP communities need to be different from the conventional ones that serve high-income customers, in particular because organizations have to act under conditions of uncertainty and change (Anderson & Kupp, 2008). Despite general agreement that they are different, there is limited discussion on the dimensions of the BMs appropriate for delivering ICTs to the BoP. Delivering ICTs to the BoP often requires collaborating with non-traditional partners (that exist outside the formal economy) and with a multitude of actors such as governments and non-governmental organizations (NGO) (Al-Debei et al., 2014; Karippacheril et al., 2013). In addition, as many ICT projects are funded by governments and donors, it is important to develop BMs that are sustainable and fit with the objectives of the project. This is particularly true given the high failure rates of such projects (Da Silva & Fernandez, 2013). Despite the agreement on the importance of developing viable BMs, there is limited discussion on what are the components and dimensions of such BMs.

Amongst the different forms of ICTs, mobile technologies are the most prevalent ones. They continue to play an important role in rolling out ICT4D projects (Heeks, 2008; Ochara & Mawela, 2015). In addition, a recent surge in mobile technologies has paved the way for innovations in products and processes (Duncombe & Heeks, 2002). Some firms have leveraged mobile technologies by offering mobile-based solutions to BoP customers. The most well-cited example of these is M-Pesa in Kenya (Mas & Morawczynski, 2009). Such solutions include mobile-based payments, that is the use of *“mobile devices to initiate, authorize and confirm an exchange of financial value in return for goods and services”* (Au & Kauffman, 2008).

In some developing countries, financial services are now being offered to customers who do not have a conventional bank account thus enabling efficient interaction between producers

and BoP customers (Tarafdar, Singh, & Anekal, 2013). Mobile phones have now emerged as a strong potential enabler for providing ICT-based products in developing economies. Mobile phone subscriptions in developing nations have increased from 1213 million to 5235 million between 2005 and 2013 (ITU, 2013).

The growing interest of organizations in serving low income consumers has led to the emergence of a different form of innovation: inclusive innovation. Technologies, in particular mobile technologies, represent a key channel to enable inclusive innovation. In terms of stakeholders, micro financial institutions (MFIs) have emerged to facilitate inclusive innovation. However, current literature has mainly examined the role of MFIs in enabling microcredit (a form of inclusive innovation). Addressing only this limited application is surprising given the opportunities mobile technologies provide to reach out to low income users. Mobile technologies can expand the reach of MFIs that do not have the financial resources that are required to reach and provide services to the rural customers (Sadhan, 2014). However, there is little evidence of an MFI playing a driving role in the adoption of mobile banking. This is even more surprising considering the number of opportunities mobile technologies provide for enabling inclusive innovation (in the form of mobile banking). Despite the promise of mobile technologies, there is little evidence of how MFIs (an important stakeholder) are utilizing them to enable inclusive innovation. Although there are interesting discussions about how MFIs have succeeded in providing microcredit (a successful inclusive innovation) to the poor, few studies have explored in detail the usage of mobile technologies to provide banking services such as savings accounts. One of the contributions of this dissertation is to address this gap by focusing on the role of MFIs in enabling inclusive innovation through mobile banking services.

1.3. India, the research context

The Indian information and communication technology (ICT) industry has witnessed strong growth in the past two decades. Positives such as a young talent pool, low cost outsourcing alternatives and the remote delivery model have helped India to establish itself as a global leader in the ICT sector (Chandrasekhar, 2001). Fuelled by this rapid expansion of ICTs, many initiatives for the socio-economic development of marginalised communities have appeared.

Armed with the potential of ICTs, India has emerged as the hub for various ICT initiatives, being the world's largest exporter of ICT services, reflecting the availability of the pool of technological skills. Firms have usually approached India as due to the lucrative low cost model, it is difficult for them to replicate the same success they had in their home countries (Parthasarathy, Aoyama, & Menon, 2015). India's population and the potential of its BoP market along with a diverse socio-economic environment, and the increased usage and availability of technologies have made India a preferred experimental setting for many large corporations. For example, the General Electric's affordable electrocardiograms and Nokia's low-cost mobile phones. The size of the BoP population represents a lucrative potential market for ICT development. India has a BoP population (those with annual incomes below US$3,000 in local purchasing power) of nearly 925 million, the largest in the world (Hammond et al., 2007). Therefore, with the large size of the BoP population, India carries the potential to become one of the most profitable BoP markets in the world. In 2012, India's BOP represented 835 million people and US$360 billion in disposable income. As of 2014, 58 percent of the total population were living on less than US$3.10 per day and a majority (78 percent) of the BoP population resides in rural areas. Even though initiatives led by ICT have increased in the last two decades, India has been ranked a low 131 out of 167 nations on

a global index that measures the level of information and communication technology access (IndianExpress, 2015).

India also had the world's largest unbanked population at 145 million households (Fulton, 2012). Notwithstanding this, India has the fastest growing telecom network in the world. It also has 15 mobile money providers, second only to Nigeria. The total number of mobile phone subscribers stands at 1009.46 million as of May 2015, 371 million of whom are in rural areas (Mirani, 2014; Wiki, 2015). The government of India and the Reserve Bank of India (RBI) have led a financial inclusion drive to provide a wide gamut of financial services such as bank accounts, insurance and micro loans to the unbanked and underserved (both in rural and urban areas). Many initiatives have exploited the growing mobile telephony usage to provide mobile based financial services. Initiatives such as the business correspondent model, no frills accounts (NFAs) and "pradhan mantri jan dhan yojna" (PMJDY), a money scheme initiated by the prime minister, are beginning to show results. The number of unbanked in 2015 stands at 233 million – down from 557 million in 2011 – marking a 58 percent drop. According to data available on the PMJDY website, as of 7 October 2015, a total of 187 million new accounts have been opened under the scheme, with a balance of over US$3,758 million (Nair, 2015).

1.4. Case description

The Indian apex bank, the RBI argued that the context in India was different from that of other countries which had launched successful mobile money services (for example M-Pesa in Kenya), and therefore developed a prescriptive regulatory framework for India (Gupta & Tahilyani, 2013). In particular, they were of the opinion that other countries: a) had services which focused only on remittances, and not a complete set of mobile banking tools such as

bank accounts, fixed deposits, recurring deposits and insurance, which the RBI wanted deployed in India, b) had relatively poor banking infrastructure compared to India, c) had a national identification number which could be used to facilitate transactions, which India did not have at the time, and d) had network operators with a monopoly position (or an effective monopoly position), which made it easier for them to achieve scale (Lal & Sachdev, 2015).

This led the RBI to develop a regulatory regime which:

a) only allowed banks to operate mobile money services,

b) created a specific model for agent networks, which allowed banks to utilize special non-profit entities, Business Correspondents (BCs) and Customer Service Points (CSPs). BCs were allowed to act as agents of banks only for the purpose of acquiring unbanked customers. Thus, BCs are essentially an intermediary between the bank and the customers. More precisely, BCs are intermediaries that offer financial services on behalf of banks to customers who, either by virtue of their place of residence (far from a bank branch) or their circumstances (small savings, illiteracy, poor identification documents), are difficult to serve. CSPs are the mobile money agents that serve as contact points for end users, conduct mobile money transactions and other cash-in-cash-out services. As BCs manage a network of agents (CSPs), they are also referred to as agent network manager (ANM). A typical form of BC model is represented in Figure 1 below.

c) restricted banks, BCs, or CSPs from charging these customers any fees (therefore requiring banks to fund BC and CSP operations through other profits), and

d) restricted the number of banks any given BC or CSP could work with.

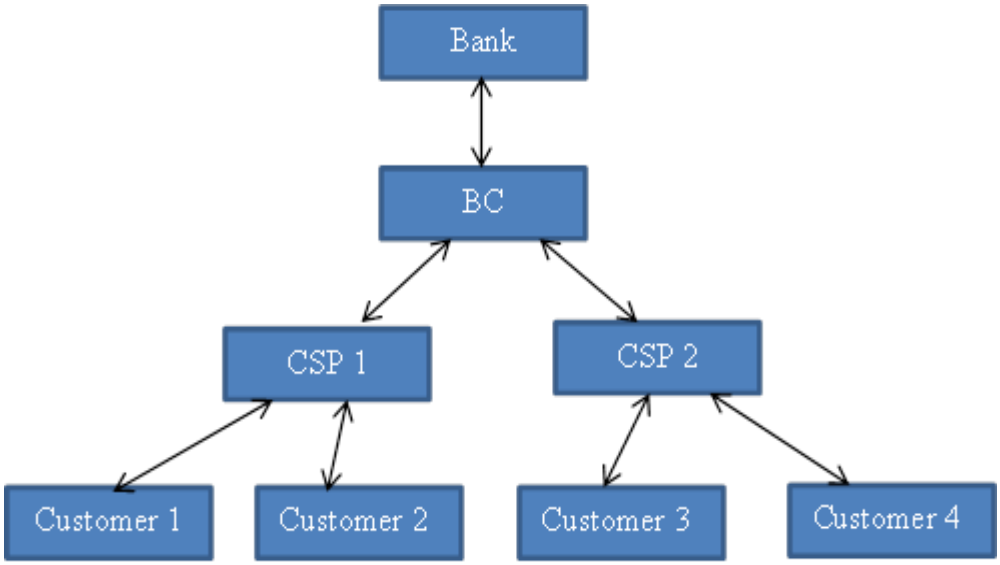

Figure 1: The business correspondent model

Over time, however, certain of these regulations were eased, for example allowing for profit entities (including mobile network operators) to act as BCs and some charging of customers. However, the core framework remains in place. In addition, new restrictions were put in place that dampened even these regulations; for example, mobile network operators (MNOs) acting as BCs were not allowed to offer cash-out facilities for their mobile wallets.

The RBI also created more general financial inclusion mandates, designed to ensure that unbanked customers had access to financial services, mobile or other. These mandates, for example, required banks to create a specific type of bank account, a "no-frills" account (NFA), to provide for the unbanked segments of the population, and established targets for the number of such bank accounts (Lal & Sachdev, 2015). These mandates intersected with the mobile money regulatory regime in that banks saw an opportunity to use the BC model as a way to push mandated financial services, such as the no-frills accounts, to the unbanked population. In 2005-2006, RBI advised that the no frills bank account opening activities were to be carried out by NGOs and Self Help Groups (SHGs). By 2007, 6 million accounts were added through this initiative. In 2010, RBI relaxed the participation norms for the BC

directive, it now allowed non-banking financial companies (NBFCs) and for profit companies to act as BCs. In 2010, a nationwide initiative called Aadhaar was launched by the RBI to provide a unique identity number to every individual. In 2011, a campaign named Swabhimaan was launched aimed at bringing banking services to large rural areas. In 2014, the RBI listed guidelines for setting up payments banks (a special category of bank) and in 2015, eleven licenses were granted. In 2014, PMJDY (Prime Minister's Public Money Scheme) was launched (phase I), followed by phase II in 2015. Figure 2 depicts how the financial inclusion mandates have evolved over time.

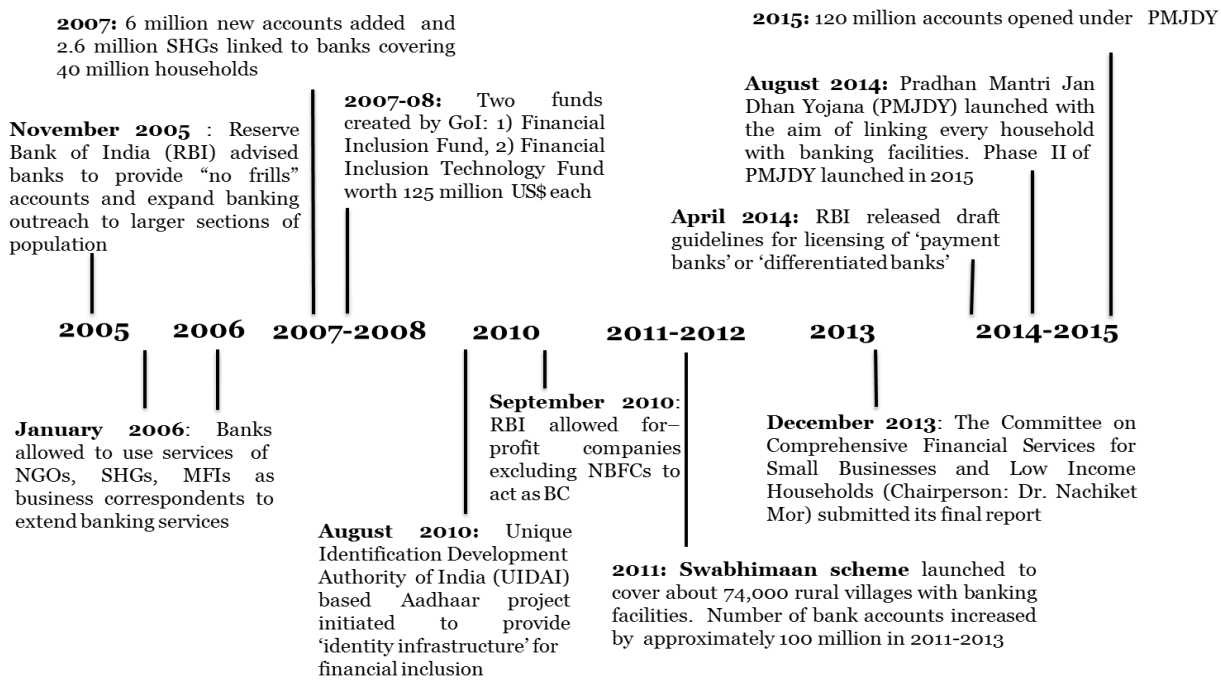

Figure 2: Financial inclusion timeline (adapted from Mehrotra & George, 2015)

In a survey of India's leading BCs by Microsave, a financial inclusion consultancy, about 70 percent of BCs reported that they currently either do not meet costs or operate at a loss (Kapoor & Shivshankar, 2012). The BC model involves banks appointing intermediaries, ranging from NGOs and microfinance institutions to specialized financial services firms, to offer a range of services on their behalf through a network of physical outlets spread across

India to reach its unbanked population (Joseph & Mazzotta, 2014b). BCs make a commission based on the number of new accounts they open for their client banks and the transactions they facilitate for these account holders. Other mandates included the "30km rule" which postulated that every agent of a BC is required to be attached to and be under the supervision of a specific bank branch (also called the base branch) and the distance between a specific agent and the associated base branch should not exceed 30 km in rural, semi-urban and urban areas and 5 km in metropolitan cities (Vadera, 2014). This restriction was particularly problematic for smaller banks as it prevented those with limited branch networks from expanding in rural areas and building national agent networks (Kumar & Dan, 2015).

Alpha is one of the leading BCs in India's mobile money sector. In order to meet regulatory requirements on financial inclusion, banks appoint BCs, such as Alpha, to reach unbanked customers and help them open accounts, make deposits and withdrawals, and send remittances (Joseph & Mazzotta, 2014a). Alpha's initial marketing slogan was "khata kholo har darwaza kholo" (open an account, open every door). To start with, Alpha reached out to its potential customers in their neighbourhood through fliers, street plays, and street signs. Additionally, the CSPs (such as the local convenience stores called kiranas) demonstrated Alpha's product to their regular customers and coaxed them to give it a try (Joseph & Mazzotta, 2014a). Alpha also initially marketed and promoted its products in the state of Bihar but stopped doing so after realising the high expenditures involved. While building an initial mass of customers, Alpha did not charge a fee to open an account or make deposits or withdrawals (as it was not permitted by the guidelines).

In September 2010, Alpha introduced two pricing plans, basic and premium. Both entailed an initial account opening fee of 100 rupees (US$2 at the time), and paid an interest rate of 3.5 percent on an account balance greater than 500 rupees. The premium plan required a flat fee

of 100 rupees, and there were no limits on the transactions that could be made in any year. The basic plan, on the other hand, charged a fee of 2 rupees per transaction—be it deposit or withdrawal. However, in June 2011, Alpha dropped its dual pricing strategy to adopt a single pricing model. It has grown with this model since then, with minor adjustments (Joseph & Mazzotta, 2014a). Alpha currently operates in two regions of India covering a total of ten states (Delhi, Bihar, Maharashtra, Uttar Pradesh, Telangana, Rajasthan, Gujarat, Haryana, West Bengal and Punjab) (Mas & McCaffrey, 2015). Each region has a head, and each area has a manager, and through this hierarchy, they manage about 3,000 agents. Alpha selected a master agent model to build its network of agents called customer service points (CSPs), recruiting small fast moving consumer goods distributors and wholesalers. Each CSP is exclusive and offers services for only one bank. At first, it focused on recruiting airtime distributors to become master agents by converting the retailers they managed into agents. However, that proved difficult, as the commissions were not competitive compared to airtime sales, the retailers did not have enough liquidity, and they were worried that digital finance might displace their airtime sales business. Currently, Alpha has served 3 million customers with over 30 million transactions with a value of over US$1.2 billion. It has partnered with 3000 agents and 4 banks for mobile banking and money transfer services.

"Alpha is an example of a supreme garage innovation! If you thought the rate of change was fast thanks to the garage innovators of Silicon Valley, wait until the garages of Delhi, Mumbai and Bangalore get fully up to speed. I sure hope we're ready – Thomas Friedman" (Dhanraj, 2014).

"By taking existing infrastructure and spare capacity among mobile networks, your model could dramatically reduce costs for service providers and customers alike. (Bill Gates on Alpha's business model" (Gupta, 2013).

There are multiple actors in the mobile money system. To ensure consistency, I introduce the terms and their definitions adopted for this thesis. The definitions and the terminologies are taken from Flaming, McKay, & Pickens (2011, Pg, 15-17).

1. *"The "account provider" is the firm that manages customer accounts. In a bank-based model, each customer has an account with a bank such as the SBI (which is the case in India). However, in a non-bank based service such as M-Pesa in Kenya or G-Cash in the Philippines* (Medhi, Ratan, & Toyama, 2009)*, customers have an account managed on a technology platform owned and operated by a non-bank entity (such as an MNO or an independent third party owner). Funds are typically pooled in an escrow account at multiple banks. In our case the account provider is effectively the bank."*

2. "*The "transaction provider" owns and operates the technology channel that customers use to make transactions. The company that manages customer accounts is often, but not always, the transaction provider as well. In our case example, Alpha in India is a company that owns and operates the technology platform that enables customers to use their mobile phones to access their accounts in the State Bank of India and make deposits and transfers."*

3. *"Mobile money services also include any number of third-party operators that provide additional services to companies such as banking, insurance and bill payments. For example, a mobile money operator like M-Pesa is required to deposit all account balances into a commercial bank. To achieve this, M-Pesa has partnered with Equity Bank and PesaPoint so that M-Pesa customers can withdraw cash from their network automated teller machines (ATMs). Utility companies have also established partnerships with M-Pesa so that customers can pay utility bills from their M-Pesa accounts."*

5. The *business correspondent* (BC) is the company that manages retail agents or the CSPs

6. The agent or the *customer service point* (CSP) is the individual/firm that operates the cash service point where the customers can perform cash-in and cash-out transactions. In India, they are normally kiranas.

7. The *customer* is the end user of the service.

Alpha is a start-up company that provides transaction services to bank customers through a network of agents (called CSPs and Super CSPs). The State Bank of India (and other banks) provides no-frills accounts; these institutions are the account providers. Alpha is the BC that employs local convenience stores, pharmacy and stationary outlets to act as CSPs that sign up new customers and provide mobile money services such as deposit, withdrawals and remittances. Alpha is the main transaction provider, as it owns and manages the technology platform that CSPs use to conduct transactions (Flaming, McKay, & Pickens, 2011). Figure 3 below depicts a money transfer transaction over Alpha's platform.

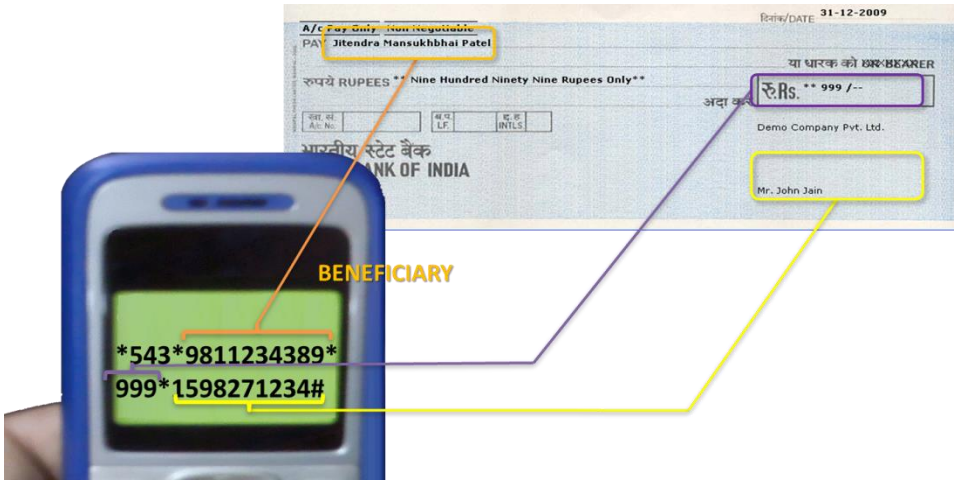

Figure 3: Money transfer transaction conducted through mobile

In Figure 3, we show a person-to-person (P2P) payment being made to another user through the mobile phone. The sender dials the following string from the mobile phone: *543* signifies that the transaction belongs to Alpha; *9812345678* is the user's account number

(his mobile number); *999* is the transaction amount and *1620* is the one-time password. This password is obtained from a booklet of codes that is provided to the customer upon his registration. A snapshot of this code booklet is presented in Figure 4 below. The sender then presses the call button and there is no charge for the call.

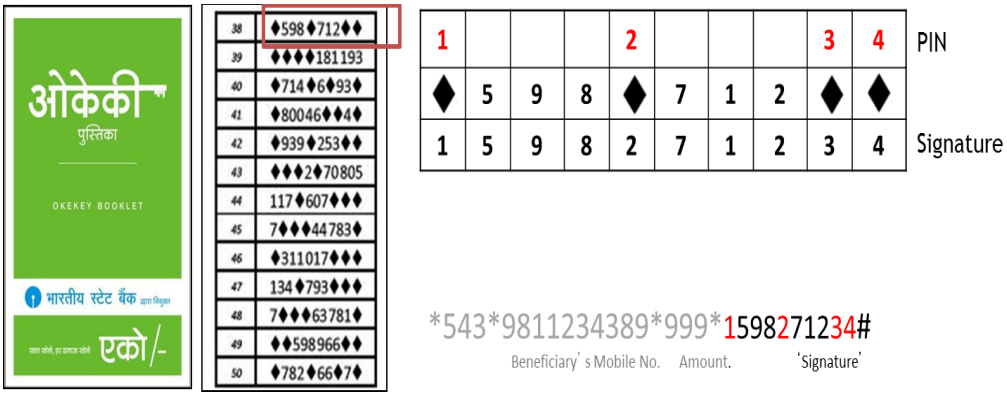

Figure 4: An overview of code booklet and how the digital signature is derived

1.5. Mobile money in India and the "Jugaad"

India has a vast non-banking population, most of whom reside in the rural areas. The traditional banking industry does not adequately cater to the needs of India's large rural populace. Setting up a conventional bank branch in a rural area would require considerable amounts of money to be spent on infrastructure and additional personnel. Most of rural Indians are cut off from access to basic financial services such as deposits and withdrawals. It is argued that about 40% of Indians lack access to the formal financial services (the number is only an estimate as mentioned by Chakrabarty (2011). Currently, there are three dominant models of mobile money (presented in Figure 5 below). In this dissertation I focus on the second model, i.e., where BCs manage agents (CSPs). In all the three models, the product ownership and the remuneration disbursement lies with the bank (as the involvement of a bank is mandated by regulation).

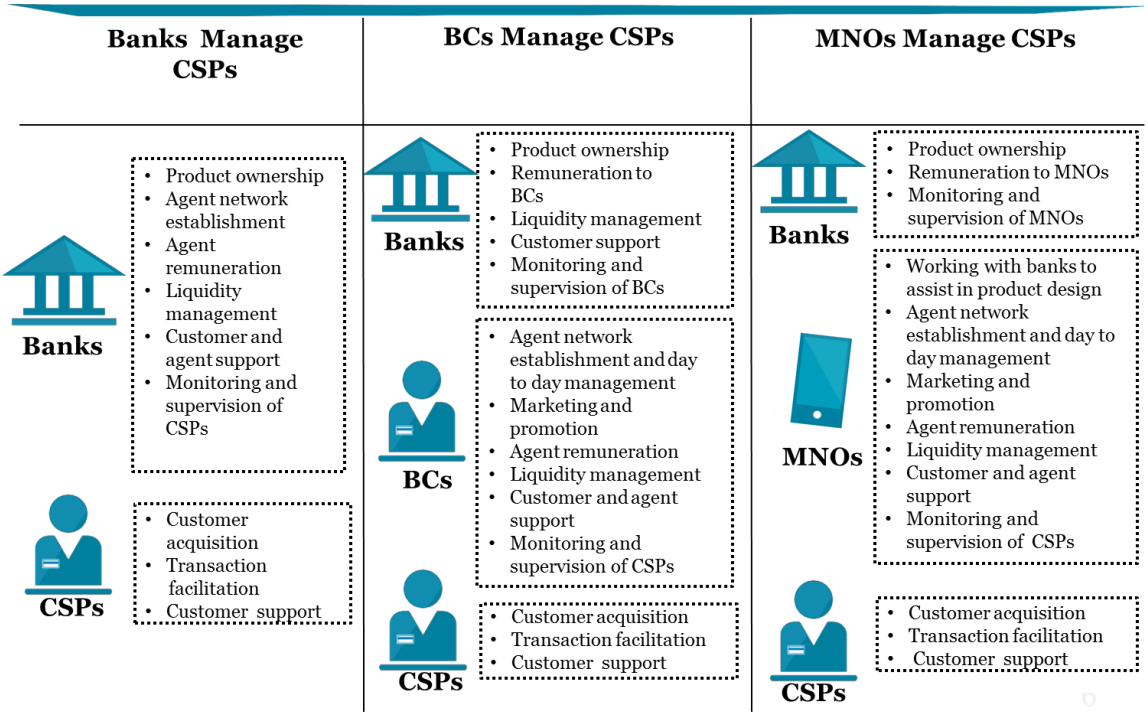

Figure 5: The three models of mobile money prevalent in India

The major challenges to serve the BoP are lack of regular income, poverty, and illiteracy, lack of reach, and the high costs associated with providing services. The cultural environment of India requires dealing with significant challenges and complexities such as the presence of multiple regional languages, a high proportion of unbanked population and low literacy rates. India has 18 official languages and about 26 percent of the population in India is illiterate[2] (Goyal, Pandey, & Batra, 2012). However, India is the second-largest telecommunications market and has 929.37 million mobile phone customers. The mobile phone subscriptions have grown at a rate of over 200 million per year. 22 percent of the world's unbanked reside and over 900 million mobile phone connections exist in India (CGAP, 2014).

[2] https://en.wikipedia.org/wiki/Literacy_in_India

Another peculiar characteristic of the Indian context is Jugaad, the Indian approach to innovation and entrepreneurship. It is increasingly clear that much of the innovation coming from India differs from the traditional structured approach to innovation. Prabhu & Jain (2015, Pg. 5-7) identify three key differences.

- *"First, Indian innovators tend to be highly frugal (Prahalad, 2012; Radjou, Prabhu, & Ahuja, 2012) and cost effective in their approach. The often work towards keeping costs low during the entire process of innovation development. Their way of innovating is a Jugaad mindset, that is they want to achieve more from less by recombining and reconfiguring existing resources and technologies. For example, Airtel, an Indian MNO has established a business model that outsources the IT network services to IBM instead of building expensive network equipment (Prahalad & Mashelkar, 2010)."*
- *"Second, Indian innovators tend not to do advance planning, rather their approach to innovation is improvisation (not sequential). They often carry out innovations in strongly connected network, leveraging, both technical and market knowledge. Such an approach to innovations equips them with adequate knowledge to handle unforeseen and ambiguous circumstances (Sarasvathy, 2001)."*
- *"Third, Indian innovators often roll out innovations that are inclusive in nature. They look out to provide innovative solutions for people and communities that are underserved by the formal institutions or are marginalised (George et al., 2015).*

All these three differences are characteristic of Jugaad innovation (see Appendix I)."

1.6. Research questions and the three papers

This thesis follows the following principle lines of enquiry:

How do organizations (especially different forms of social enterprises) operating in developing countries leverage mobile technologies to develop mobile money services for the socio-economic development of BoP and marginalized communities in resource constrained and highly regulated environments and how do such organizations evolve over time?

Many ICT projects targeting the BoP communities have emerged during the last decade. A key concern for organizations aiming to serve BoP markets through ICTs is the pathways to achieve scale. In the past such initiatives were led by governments and supported by donors and other funding agencies. However, more recently, the scenario has evolved with private firms and social enterprises playing a greater role. These include Microsoft Research (India) and GrameenPhone's AppLab (Heeks, 2012). Social enterprises are providing ICT services to the BoP but they are plagued by several challenges to scale and thus tend to remain small. Some of these challenges involve the lack of financial resources, lack or absence of supporting institutions and political support, and inadequate infrastructure. The first paper of this dissertation addresses this concern and thus asks the question:

How do ICT social enterprises that operate in resource challenged environments achieve scale?

Identifying the business model is a critical aspect for most ICT4D projects. This explores how to make services self-sustainable and revenue generating to the provider. As the market for ICT4D solutions becomes more competitive, new business models are needed in order to continue to deliver value to customers. Delivering affordable ICT services in BoP markets is a complex challenge, especially because of the distinctive traits of these markets. In particular, BMs for BoP markets are based upon collaboration with non-traditional partners (that exist outside the formal economy) and with a multitude of actors such as governments

and nongovernmental organizations. In addition, as many ICT projects are funded by governments and donors and given the high failure rates of such projects, it is important to develop BMs that are sustainable and fit with the objectives of the project. Thus, it is intriguing to explore the dimensions and components of BMs that are apt to deliver ICTs in BoP communities. Therefore, proceeding further this dissertation examines the following question in Paper II:

What constitutes an appropriate business model to deliver ICTs to the BoP?

An ICT initiative that is increasingly deployed in developing countries relates to mobile money schemes that aim to enable financial inclusion and socio-economic development. Mobile technologies in particular have provided an opportunity for leapfrogging infrastructural shortcomings. Technology leapfrogging, defined as *"the application of a new technology in an application area in which the previous version of that technology was not deployed"*, is also evident in many rural areas of the world (Davison et al., 2000). For example, mobile technologies have reached the remote villages and other places where broadband and fixed line infrastructure were absent. By enabling connectivity to a large number of people through mobile networks, mobile technologies have served as a platform for several "inclusive innovations" in the areas of health, education and banking (OECD, 2015). Inclusive innovation is an emerging form of innovation in developing countries and is the means by which new goods and services are developed for and by people living on lowest incomes, marginalized groups such as women and ethnic minorities[3]. Inclusive innovation involves the participation of the marginalized in identifying their development priorities and

[3] The text comes from a previously published conference paper, entitled: Women and ICT enabled well-being: Inclusive innovation by micro financial institutions in India, proceedings of 13th International Conference on Social Implications of Computers in Developing Countries, Sri Lanka, 2014

in providing incentives for various actors to address their needs. Within these marginalised communities, MFIs play a key role in enabling inclusive innovation. By investigating the role of MFIs in facilitating inclusive innovation through mobile technologies in rural areas, I hope to offer some important lessons on the ways in which the application of mobile technologies can enable inclusive innovation and how MFIs are involved in doing so. In particular, Paper III considers mobile banking (a specific application of mobile technology) and asks the question:

How can MFIs leverage mobile technologies to foster inclusive innovation?

These research questions are addressed in the three research papers that are discussed in detail in section 1.9.

In addition to the three papers, the draft paper presented in Appendix 1 explores how Indian start-ups achieve scale through a Jugaad mind set. Drawing on notions of bricolage and Jugaad innovation, it examines the facilitators and inhibitors of scaling in the Indian context. The paper considers the specificities of the mobile money market in India and investigates how start-ups operate in a resource constrained and competitive environment. This paper is an extended version of that presented at the Americas Conference in Information Systems, Savannah, August 2014. The paper describes the Jugaad innovation model and compares it to more traditional approaches to innovation such as improvisation and bricolage.

1.7. Related work and theoretical aspects

The main focus of this thesis is on the bottom of the pyramid (BoP). Multiple perspectives on the importance of BoP markets exist. The BoP markets have some peculiar characteristics such as inadequate infrastructure, information asymmetries and weak or absent formal

institutions (Tarafdar & Singh, 2011), hence are not fully developed. In BoP communities, it is argued that four different kinds of separations exist (Scott & Tarafdar, 2014).

- First, spatial separation: BoP communities are geographically distributed and often live in physically remote areas having poor transportation services and so, it is difficult to access these communities (Vachani & Smith, 2008).
- Second, temporal separation: This implies that "*production and consumption of goods and services are separated in time"* (Tarafdar, Singh, & Anekal, 2013). It occurs when the sellers are unable to reach out to the customers within a specified and relatively limited period of time. For example, farmers who produce perishable commodities such as wheat and barley might not reach out to prospective customers in a timely manner.
- Third, informational separation occurs because BoP communities are 'information deprived' (Banerjee, 2006). Thus, BoP buyers and sellers have unbalanced information or even incomplete information about the available products and services due to low levels of education and lack of access to media sources such as newspapers and television.
- Fourth, financial separation implies that buyers of goods and services are unable to afford the products (Aoyama & Parthasarathy, 2012).

The BoP is not a socio-culturally homogenous market, and it is considered to be having limited skills and low levels of literacy (Parthasarathy, Aoyama, & Menon, 2015). This implies that organizations need to consider the differences in the needs of the market and thus cannot operate a "one size fits all" approach. In addition, BoP communities are plagued by regulatory inadequacies as the governance structures they are embedded in, informal in

nature and influenced by socio-political issues such as caste, religion, local politics and other community rules. This hampers the enforcement of contracts and regulations in BoP markets, and thus, organizations are hesitant to participate in the initiatives aimed at the BoP (Tarafdar, Anekal, & Singh, 2012).

1.8. Research process and methods

This section discusses the research methods adopted for this research and the data sources included.

1.8.1. Data sources and data collection

This study draws on data collected from semi-structured interviews, field visits and archival analysis:

Semi-structured interviews

I conducted a total of 70 formal interviews (10 in the exploratory phase with field experts and 60 in the confirmatory phase) with 43 informants. This was supplemented by informal conversations with field experts that took place throughout my research period. All the informants were assured of anonymity.

I conducted the first 10 interviews with field experts in Mumbai and Delhi. These informants spanned different roles in the mobile money sector and were associated with MNOs, banks and the NPCI. Then, to inform the two case studies themselves, I conducted 60 semi-structured interviews in Delhi and Varanasi, with key informants identified through a "snowball" process. The exploratory study helped to identify the key initial actors (in my case the case firm Alpha India Financial Services and its partner firms) in the mobile money

sector. Subsequent interviewees were then identified by prior informants as actors who had been more involved in relevant changes within the sector. Following Lincoln and Guba (1985) guidelines for "purposeful sampling", informants were selected based on the information that they were able to provide concerning partnership formation and development over time. Following the snowball sampling technique, interviewees who were active in the process of partnership development were asked to recommend additional informants (from the partner firms). This yielded a number of additional interviews beyond the core sample. Although adopting a snowball sampling technique leads to sameness, it was fruitful for my thesis as it helped me gain the trust of the informants (since many informants were reluctant to share information as they thought the information might get leaked to the competitor firms).

Some informants were interviewed several times so as to seek clarifications and ask follow-up questions. For confidentiality requirements, the interviews were not tape recorded. I took extensive field notes which were transcribed within 24 hours of the interview. Even though I could not tape record the interviews, I was allowed to take pictures of the site and collect other material artefacts such as publicity material and pamphlets.

The entire interview procedure involved an iterative process of collecting data, analysing data, and seeking new informants on the basis of feedback considered important by prior informants. This approach resulted in a refined and comprehensive sample of informants and increasingly focused data, until further data collection failed to reveal new information and subsequent analysis yielded no further explanation of the given theme. This state is termed by Glaser and Strauss (1967) as ‘theoretical saturation’. Informants spanned different organizational levels, from business development, sales management to top level management (the vice president). In addition, I also interviewed independent consultants and

bank representatives who were only remotely associated with the company. Finally, I interviewed participants from Alpha's partner network (including CSPs and MFIs). The details of the informants are listed in Table 1 below.

Papers I and II mainly build upon data sources from Alpha, CSPs, independent consultants, banks and clients in Delhi (along with a few inputs from respondents within Cashpor). Paper III, on the other hand, considers primarily Cashpor representatives, independent consultants, banks and clients in rural areas as the key data sources (with little input from Alpha, the technology partner of Cashpor).

Informants Organization	**Interviews (Face to face)**	**Interviews (Skype/Phone)**	**Total**
Cashpor: Business Development Manager, Training Manager, Senior Training Manager, Project Manager, Branch Managers, Loan Officers	10	5	15
Alpha: VP, International Business, Business Development Managers, Business Analysts	6	4	10
Customer Service Points	10	3	13
Clients (females in rural areas)	10	0	10
Clients (males in Delhi)	5	0	5
Independent Consultants	3	2	5
Banks	2	0	2
Total	46	14	60

Table 1: Details of the informants

Field visits

Another crucial source of the data was the field visits. I spent two weeks at the CSP's site in Delhi observing the interactions and the usage of the mobile money system. I also interacted with customers informally who visited the CSP to conduct the transactions but were unwilling to be interviewed further. During this period, I also witnessed the day-to-day activities of the CSPs, the way they conducted the transactions and organized activities

around mobile money services. The purpose of these field visits was to corroborate the claims of the other respondents (especially those of Alpha) and to further explore the routines and work practices of the CSPs. These field visits also helped me to directly contact customers for further data collection.

BoP individuals often are geographically dispersed and live in physically distant areas that are difficult to reach due to poor transportation facilities (Vachani & Smith, 2008), it is difficult to find a common place to interact with them. These CSPs served as appropriate sites to contact these customers. For example, many of the daily labourers visited these CSPs from 8 pm to 9 pm. This was an appropriate time to interview them as they are free then, willing to interact and respond to queries. Furthermore, one other motive for visiting the CSPs was to witness the overall process of conducting mobile transactions (deposits, withdrawals and remittances). Although the organization provided several documents such as PowerPoint presentations and manuals to explain the overall process, it was necessary to examine the whole process carefully in situ. Therefore, I observed in detail the various steps involved in the transaction processing such as the time the client enters, presents his or her details to the CSP, CSP inquires further and so on until the time the transaction concludes. A further motive for doing field visits was to observe the differences in work practices during the day. This included, for example, the time period during which the mobile banking system (Simplibank) went offline (for two hours during a day) and the time period during which the client footfall was high. Finally, at one CSP I took part in a trial transaction and thus used the technological artefact.

In addition to the two weeks spent at the CSPs sites, I also spent a week at Cashpor (another BC and Alpha's partner) based in Varanasi. In Pandeypur, one of the rural areas in the outskirts of Varanasi, I attended two weekly meetings with the women clients of Cashpor

where they used Alpha's technological platform to conduct the transactions. In addition to the interview notes, I also took extensive field notes to corroborate the claims of the informants. The rationale behind field visits to Delhi and Pandeypur was to gain a balanced outlook of rural and urban or semi-urban areas.

Documents and secondary material

The other main source for collecting the data concerned related documents and archival material. These included internal and publicly available records spanning the period 2007 to 2014. In this regard, archival records, organizational records, annual reports, project reports and updates, books written on or about the firm and its partners, published case studies, websites, documented and recorded opinions of experts, consultants, regulatory officials and articles in newspapers, journals, and on social media sites such as Facebook were used to construct longitudinal narratives of the case firm and its history. The archival documents were helpful as a tool for engaging informants in discussions of how the firm grew and developed through time. The combination of interviews and archival data allows for elaboration and validation (Strauss & Corbin, 1998) of the collected data and increased confidence that the details about the firm and its partners are presented accurately.

1.8.2. Focus and epistemological stance

The research methodology should be consistent with the epistemological nature of the research study and is often based on the philosophical assumptions of the researcher. *"Qualitative research epistemology can be interpretive, positivist or critical"* (Myers & Avison, 2002, Pg.6). My research is interpretive because the knowledge of reality is gained through social constructions, i.e. language, shared meanings, documents, tools and artefacts (Klein & Myers, 1999). Interpretive methods of research in information systems (IS) are

"aimed at gaining an understanding of the context of the IS, and the process whereby the ICT4D projects are implemented in a specific context" (Walsham, 1993, Pg.4-5). Interpretive research aims to comprehend a particular phenomenon through the meanings that people allocate to them and is a good tool to gain in-depth insights into information systems (Klein & Myers, 1999). In this research the actions and practices of actors and developers of mobile money are embedded in social and institutional context and thus insights about such actions and practices are critical to understanding the process of usage and development of mobile money services. The research questions of my study also underline that this research should be addressed with a qualitative approach because it allows the researcher to discover nuances, details, meanings, sense making and complex relationships in the data.

Moreover, because I use an interpretive approach there will be numerous interpretations and understandings in the reality of how mobile money is being used and advanced in developing countries. Therefore, these interpretations cannot be measured or used to make predictions. Besides, the research aims to explore the phenomenon of usage and development of mobile payment solutions within a unique context (in our case India). For all these reasons, I see this research as a qualitative case study based on an interpretive epistemological approach. Nevertheless, the findings from this study can be tested and generalized by further research using both quantitative and qualitative approaches. Even though we adopt a qualitative case study research method, we do report certain metrics such as the number of transactions, users, and total values of transactions.

In addition, it is important to clarify my own position in the research process. In the main, I am involved as a researcher through participant observations and as an interviewer. Thus, the collection and analysis of data is based on my own subjective interpretations of meanings, actions and activities and my presence might have influenced the interviewees or others being

"researched". In addition, during the course of my field work at several instances, I discovered myself being influenced by the respondents. For example, after my fieldwork in Varanasi, I realised how difficult the lives of these women are. They lived in mud houses filled with cow dung cakes, where I would find it difficult to tolerate for even a short time. I realised, at the culmination of my journey, how fortunate I am to be living in all the comforts of life, totally unperturbed by the realities of rural India.

This dissertation principally adopts a non-positivist and inductive research approach, and in accordance with these inquiry lines I did not formulate very specific research questions before the empirical study. A more general and theoretical question is necessary and often sufficient to determine research design, select research method(s) and initiate the study. More specific questions emerged during the study as I developed a deeper understanding of the empirical context and people studied. Even when specific empirical questions are defined in advance, it is very likely that they will be changed during the course of the empirical study (Cecez-Kecmanovic & Kennan, 2013). For example, at the outset I started with the idea to investigate what practices are emerging due to the usage of mobile money systems. Even though I investigated the role of practices to some extent, the focus evolved from practices to resource-constrained innovation and business model perspectives. I adopted an inductive research approach as it is considered appropriate for uncovering emergent themes hidden in raw data (Thomas, 2006). Thus, due to the exploratory nature of the overall research question in this study, no hypotheses were formed prior to data collection and key themes emerged during the data collection and analysis phases (Suddaby, 2006). In addition, in accordance with the principles of inductive inquiry, this dissertation arrives at conclusions that are only probable and not generalizable (as inductive reasoning is concerned with finding generalization through a number of cases) (Richardson & Kramer, 2006).

1.8.3. Validation steps

In order to substantiate the findings that emerged from primary sources (interviews), I used secondary sources (technology artefacts such as the mobile money system used by CSPs and the documentary evidence) and interviews from third party representatives (such as independent consultants) to verify claims made. I provide an example of how I did this: There were several mentions of the CSPs overcharging the clients (a charge higher than the prescribed fees) and such insights were revealed by the clients. However, the CSPs categorically denied this. Therefore, this was a major discrepancy and I pondered whom to believe. To resolve this, I took two steps. First, I contacted an independent consultant who worked as a freelancer providing consultancy services to other mobile money providers as well. He confirmed that this practice of overcharging the clients was quite prevalent in the case of Alpha and also with CSPs related to other mobile money service providers. Second, I also made use of secondary material to corroborate the claims of clients (in particular, I checked the customer complain forum website) and found that overcharging was quite pervasive across many CSPs.

In another instance, I was told by a representative of Alpha that they are still involved in the business of opening mobile based accounts and that all the CSPs are involved in this. However, this claim was not substantiated when I did my field visits at the CSPs. Out of the 10 CSPs I visited, 5 were not undertaking account opening activities. In fact, during one of my field visits, I noticed that the CSPs would ask the clients to go to the nearest branch to open a bank account but they would readily perform the remittances. One CSP, who offered both the mobile banking and remittance services confirmed this and also explained the reasons behind why some CSPs offered only remittance products.

Thus, secondary documentation, primary information from independent actors and field visits all proved crucial to the data validation procedure undertaken in this study.

1.9. Overview of research papers

We conclude this first chapter by introducing the three papers that follow under the headings overview, theoretical aspects, and contributions that each paper makes.

1.9.1. Paper I: Scaling ICT social enterprises in resource challenged environments: Is bricolage the solution?

Overview

This paper explores the different phases involved in the scaling process of a start-up that provides ICT enabled services (mobile banking and money transfers) to the people at the BoP. It discusses how the company that operated under strict regulations and facing resource constraints created mobile banking products for the BoP and subsequently, how it achieved scale.

The paper begins with an analysis of the ICT4D initiatives and the importance of scaling for such projects. It also discusses why scaling is problematic in these contexts. The paper also discusses the role of ICT social enterprises in ICT4D projects where scaling is even more problematic. Following the description of methods, case and the context, the paper identifies seven phases along which the scaling can be analysed. The phases are differentiated based on the kind of bricolage involved, and the portfolio of products and services added. This is followed by a discussion of the bricolage involved in each of the phases and its implications on scaling.

Theoretical aspects

The paper adopts bricolage as a theoretical lens to understand scaling in this context. *"Bricolage involves leveraging existing resources and applying combinations of resources to new problems."* (Baker & Nelson, 2005, Pg. 333). Bricolage allows us to understand how organizations such as Alpha operating in a resource-constrained environment could leverage existing resources, reconfigure them to create ICT based services and expand their scale of operations.

Contributions

The paper contributes to the literature on scaling of ICT innovations in cases where the lead is taken by a third party entity such as a social enterprise. It also contributes by demonstrating that various forms of bricolage can be crucial for ICT social enterprises to achieve scale. It also shows that during the process of scaling, there are instances of de-scaling and re-scaling as well. A model is proposed to link the key phases with the associated bricolage forms and the product focus.

1.9.2. Paper II: Delivering ICTs to the BoP: The quest for appropriate business models

Overview

This paper critically analyses the literature on business models to identify BM dimensions most appropriate to deliver ICTs to the BoP. In addition, it identifies the interdependencies between these dimensions. It argues that the BMs for BoP markets are different than those for traditional markets because of the particular characteristics of these communities. The paper

starts with a discussion of the importance of BoP markets and highlights the ways in which the BMs for these markets differ from conventional ones. The importance of BMs to deliver ICTs to the BoP is also emphasized. Next, the paper reviews the literature on business models and argues that value co-creation forms an importance aspect of BMs appropriate to deliver ICTs at the BoP and how it is important to incorporate such a dimension in the BM literature. The paper proposes V5BM dimensions: value proposition, value network, value finance, value architecture and value co-creation. This section is followed by the case description and methodology. In the findings section these dimensions are discussed in more detail to incorporate insights from our case. The ways in which value co-creation occurs are explored in this section. The paper concludes by discussing further the importance of the proposed V5BM dimensions for delivering ICTs to the BoP.

Theoretical aspects

Through the perspective of value co-creation and a resource based view (RBV), this paper enhances our understanding of how value co-creation is crucial for BoP markets. Business models based on value co-creation among partners can greatly benefit organizations to reach out to BoP customers. The rationale behind the concept of value co-creation is that the resources necessary to respond to the demands of the organization are not fully controlled by one actor and it is not possible to transfer resources between different firms (de Reuver, Bouwman, & Haaker, 2009). With value co-creation, organizations with different sets of resources can join together and create new value that one sole organization is unlikely to create on its own.

Contributions

In addition to proposing the V5BM dimensions, the paper suggests four ways (barter, addition, amalgamation and governance) in which value co-creation can occur in BoP communities. Furthermore, it also argues that instead of a value network, an innofusion network is required to deliver ICTs to the BoP, one that links distant demand and supply and undertakes several innovations in products and processes. Finally, although much has been discussed about the differences in BMs for BoP, we only have limited knowledge about the key dimensions of such BMs. This paper helps to fill this gap in the literature.

1.9.3. Paper III: Inclusive innovation through mobile technologies? Insights from micro financial institutions

Overview

This paper focuses on the usage of mobile technologies by MFIs to enable inclusive innovation in marginalized communities. Using rural women as an exemplar, the paper explores how MFIs leverage mobile technologies to foster inclusive innovation and considers the impact of inclusive innovation on the lives of rural women. The paper argues that to facilitate inclusive innovation in marginalized communities, organizations need to introduce innovations that could be afforded by the poor and introduce measures that enhance capabilities of these communities to absorb innovation. Furthermore, there is a need to introduce innovations both in products and in business processes to enable inclusive innovation.

Theoretical aspects

The paper builds upon the emerging stream of research on inclusive innovation, defined as *"the means by which new goods and services are developed for or by those living on lowest incomes*"(Foster & Heeks, Pg.333). Inclusive innovation is based on the following key tenets as identified by (Foster & Heeks, 2013b, Pg. 351; Swaans et al., 2014).

- Scope: Inclusive innovation argues for inclusivity in all aspects of an innovation from the design, implementation, processes to its final impact. It also seeks to address development aspects of excluded groups and in many cases tends to focus less on profit maximization.
- Innovation: the nature of innovations is inclusive, participative and based on an in-depth understanding of local needs and societal context.
- Actors: Inclusive innovation emphasizes the role of the poor as producers and consumers of innovations. It also puts significant importance on the role of intermediaries that link remote demand and supply.
- Learning: Learning in inclusive innovation systems revolve around reflection, learning by interacting with the poor, information exchange and learning by doing.
- Relations: Inclusive innovation recognises the role of both formal and informal relations amongst the stakeholders.
- Institutions: Informal and formal institutions are acknowledged as important elements of inclusive innovation systems and these institutions evolve overtime as innovation diffuses.

Contribution

This paper provides significant contribution to the literature on mobile banking for inclusive innovation and to inclusive innovation in general. The study demonstrates that in addition to innofusion intermediaries, fostering inclusive innovation in communities of rural women requires the presence of strong and influential infomediaries as well. It also demonstrates that to facilitate adoption of inclusive innovation, a number of innovations in products and in processes are crucial. The study also highlights that organizations such as MFIs should consider providing appropriate skill development programs and incentive mechanisms to foster inclusive innovation. Lastly, this study identifies the impact of using mobile technologies on the livelihood assets owned by the marginalised.

2. Paper I

Scaling ICT social enterprises in resource challenged environments: Is bricolage the "solution"?

Abstract

In recent years, a growing number of social enterprises have focused their efforts on developing ICT projects aimed at marginalized and underprivileged communities in emerging economies. Driven by both a social and an enterprise objective, ICT social enterprises have emerged as prominent actors in ICT for development projects (ICT4D). Despite their potential to include the marginalized in market-driven development, ICT social enterprises operating in developing countries face various challenges while scaling their operations and often remain small. Such enterprises need to counter challenges related to financial and human resources. In addition, they also need to deal with the absence of supporting institutions and lack of political support. Based on research conducted with an ICT social enterprise that has now scaled up its operations to 10 states in India, this study seeks to understand how social enterprises that deliver ICT services to those at the bottom of the pyramid (BoP) achieve scale. Building upon the theoretical perspective of bricolage, I explore the different phases involved in the scaling of ICT social enterprises and I highlight the important role that bricolage played in these phases. Our findings suggest that scaling of ICT social enterprises can be conceived as consisting of seven phases. In addition to the first five phases that involve different forms of bricolage, this study also highlights phases of de-scaling and re-scaling.

Keywords: Social enterprises, ICT for Development (ICT4D), Bricolage, Scaling, India, Mobile banking, Bottom of the Pyramid (BoP)

2.1. ICT innovation and scaling

In the face of broad and deep-seated socio-economic problems, organizations are beginning to use information and communication technologies (ICT) in an attempt to address the socio-economic development of people at the bottom of the pyramid (BoP) in the developing world (Abraham, 2007; Brewer et al., 2005; Kuriyan, Ray & Toyama, 2008). Those at the BoP include individuals who are illiterate, economically deprived, and may be marginalized because of race, religion, gender, disability and location (Malik, Nicholson, & Morgan, 2013; Weidner, Rosa, & Viswanathan, 2010). Other challenges hindering the development and implementation of ICT-based products in the developing world include high cost, low return and high risk of investment, as well as a lack of adequate infrastructure (Touray et al., 2013).

Despite these inhibitors, a number of pilot projects have focused on providing ICTs to help BoP customers (Kuriyan et al., 2008) but because of the challenges mentioned above, many of these initiatives fail to sustain and scale beyond their pilot phases and nor do they generate revenue (Heeks, 2008; Walsham & Sahay, 2006). Therefore, although ICTs offer potential for market development at the BoP, the economic and social impacts of such initiatives remain unclear and there are many examples of failure (Avgerou & Walsham, 2001; Walsham & Sahay, 2006).

In the late 1990s and early 2000s, the majority of the ICT-led projects in the developing world were initiated by governments, donors and NGOs. Heeks (2012) argues that one of the fallacies in the ICT for Development (ICT4D) literature is that the bad or failed ICT projects are attributed to governments and donors, while the good ones are credited to the efforts of private enterprises. However, more recently, third party entities such as entrepreneurs and

social enterprises have entered the scene by providing ICTs to the BoP (for example, GrameenPhone's AppLab and Ushahidi (Heeks, 2012)).

Social enterprises are *"private organizations dedicated to solving social problems, serving the disadvantaged and providing socially important goods that were not, in their judgment, adequately provided by public agencies or private markets"* (Dees & Backman, 1994; Mair & Marti, Pg.4). Social enterprises are enterprise-oriented and they have both business and social development goals (Hutchinson & Molla, 2009). I define, ICT social enterprises as ICT-based enterprises that have both a social and a profit mission. ICT-based enterprises are enterprises that either i) produce hardware, software and telecommunications products; ii) use ICTs as a primary technology or that iii) provide other ICT-related support activities (Duncombe et al., 2005).

Research shows that many social enterprises fail to scale up and often remain small; thereby resulting in closure in certain cases (Gradl & Jenkins, 2011; Heeks & Arun, 2010). In addition, they are dependent on a major degree of institutional and financial support from governmental agencies, banks, financial intermediaries and other donors (Heeks & Arun, 2010). Social enterprises face an enormous challenge in scaling their operations and also achieving greater returns for their donors such as funding agencies (Bloom & Chatterji, 2009). The latter is particularly crucial for ICT4D projects as they are funded by various agencies and donors.

In addition to the challenge related to access to funds, there are several other challenges that social enterprises need to deal with while scaling up. Social enterprises (especially those operating in developing countries) often need to deal with the absence of supporting institutions. Thus, social enterprises have to cope with institutional constraints as they address

socially relevant problems without supporting regulatory, technological or political institutions and structures (Desa, 2008). Lack of institutional and political support further hinders the scaling of ICT projects.

An inquiry into this scaling process is crucial for a number of reasons, in particular:

1. Scaling represents an understudied phenomenon and there are few accounts and little theoretical understanding of the scaling process in the ICT literature (Foster & Heeks, 2013; Walsham & Sahay, 2006).
2. ICT-based innovations need to deal with a 'chicken and egg' problem before network effects can be accrued: a critical mass of users is needed to generate revenue streams to enable product development and yet there cannot be users without a product (Mas & Radcliffe, 2011). Thus to scale up, both customers and producers need to be present to enable network effects and subsequent revenue generation.
3. Scaling is complex, it is not only about numbers and size, but is a socio-technical problem that involves a heterogeneous network composed of technology, people, processes, and an institutional context (Sahay & Walsham, 2006).
4. As many ICT innovations fail to scale, it is crucial to understand the dynamics of scaling and the processes involved to make scaling more likely (Foster & Heeks, 2013).
5. Although there has been a recent study that explored scaling in the context of a developing country (i.e., Kenya) (Foster & Heeks, 2013), further investigation of the scaling phenomenon in the context where third party actors are involved to a greater extent is called for (Foster & Heeks, 2013).
6. ICT social enterprises that achieve scale need to deal with technological challenges owing to their small size (as technical complexity increases, a higher level of technical skill is required of users to be able to use ICT effectively).

7. ICT social enterprises need to deal with challenges related to financial resources, and particularly those in the domain of ICT, constantly seeking funding from governments and other donor agencies. They also need to deal with challenges related to human resources, institutional and political issues (Sahay, Sæbø, & Braa, 2013; Sahay & Walsham, 2006; Walsham & Sahay, 2006).

Because of the importance of scaling for ICT social enterprises and the plethora of resource challenges they are exposed to, it is intriguing to explore the processes through which such organizations achieve scale. Our research question therefore is*: "How do ICT social enterprises that operate in resource challenged environments achieve scale?"*

To investigate the phenomenon, we discuss a case study concerning a social enterprise that provides mobile banking services in India. The company targeted BoP customers, mainly migrant workers. We look at the company during the period 2007, when at the pilot phase, to 2013. Unusually, the company has managed to scale and is a success story. We use the theoretical lens of resource bricolage to help us understand how this organization achieved scale and the phases involved in the scaling process.

To investigate scaling we focus on mobile money, a form of ICT that has been rolled out to a large extent in developing countries. In the next section we discuss the problem of scaling and our theoretical lens. In section 2.3, we present the research context of this case study and our methodology, whilst in section 2.4 we present our case findings and demonstrate how scaling was achieved in that context. Section 2.5, preceding the conclusion, discusses the different phases of scaling.

2.2. Scaling ICT social enterprises and bricolage

In the context of information systems (IS), scaling is defined as *"the expansion of the system in scope and size"* (Sahay & Walsham, 2006, Pg. 185), where ICT projects might move from pilot to full-scale by, for example, adding new users, expanding core functionalities and expanding their geographical coverage, type or volume of data maintained (Monteiro, 1998; Shaw, Mengiste, & Braa, 2007). More precisely, we adopt the definition of scaling as the *"process through which [the IS] is taken from one setting and expanded in size and scope within that same setting and/or also incorporated within other settings"* (Sahay & Walsham, 2006, Pg. 185).

In addition to the contention that scaling is a process, it is not a uniform and homogenized process and may consist of a series of interlinked phases (Braa et al., 2004; Sahay & Walsham, 2006). However, there is limited understanding of what those phases might be, especially in cases where the scaling process is led by third party actors such as social enterprises and NGOs (Foster & Heeks, 2013). At its simplest, scholars have noticed two phases to scaling: pilot and scale up, wherein pilot is associated with innovation and scale up with diffusion (Davidson & Leishman, 2010; Qiu, 2007). Thus, scaling and innovation are considered as two separate processes. However, recent studies on scaling for the BoP have demonstrated that innovation (in the form of re-invention and co-invention) also occurs during the scaling process (Foster & Heeks, 2013; London & Hart, 2004; Rogers, 2010).

Innovation has greater importance while scaling ICT for the BoP because of two particular characteristics of the BoP communities. First, there exists separation between the designers and marketers of ICT and the users that might lead to a poor fit between the designs and actual usage (Heeks, 2002; Tarafdar, Anekal, & Singh, 2013). A second characteristic is the

heterogeneity of the BoP communities so that one design might not suit the needs of all groups (Prahalad, 2012). Thus, there are multiple instances of innovations being carried out during the scaling for BoP as opposed to the traditional view that innovation occurs only in the pilot phase (Foster & Heeks, 2013).

In addition, scaling ICTs for the BoP involves different roles and relations that are embedded in the context of resource constraints and uncertainty. Thus, the differing characteristics of the BoP context create an imperative for strategies that address local resource availabilities (Foster & Heeks, 2013). The BoP context of resource constraints and uncertainty assumes greater importance for social ICT enterprises than for larger ICT firms. Large ICT firms tend to focus more on technical innovation than on innovations around supply processes and service delivery mechanisms (Anderson & Kupp, 2008; Foster & Heeks, 2013). ICT social enterprises need to focus on both technical innovation (that related to the technology features) and social innovation (that related to processes, delivery and distribution of ICTs to the BoP).

Social enterprises that plan to achieve scale are faced with constraints challenging their growth such as scarce resources, limited access to resources or decreasing returns to scale (Bloom & Chatterji, 2009; Chowdhury & Santos, 2010). In addition, as ICT social enterprises deal with the BoP markets, they are exposed to systemic barriers to scale such as low levels of education, inadequate infrastructure and poorly designed or enforced regulation (Gradl & Jenkins, 2011). Furthermore, ICT social enterprises face uncertainty related to revenues and funds as most of them are dependent on external sources of funding from governments and donor agencies. Scaling in these circumstances turns out to be challenging as, "scaling is not about constant profits and expansion, as is often expected, but consist of a dichotomy of losses, contractions and gains" (Sahay et al., 2013, Pg. 294). Scaling is also not a simple process of technology transfer, but a learning process that demands continuous adaptation of

the innovations. Thus, as ICT social enterprises scale and expand to different geographies, learning and adapting innovation to local needs and requirements are essential.

ICT social enterprises with interests in the BoP markets are exposed to a significantly higher number of resource challenges both in the internal environment (financial, human and managerial resources) and in the external environment (lack of adequate infrastructure, low literacy rates, lack of political and institutional support and poorly designed regulation). For example, social enterprises often find it difficult to establish themselves as a credible and legitimate entity as their activities often do not confirm with the existing institutional norms (Sandeep & Ravishankar, 2015).

As scaling is considered contextual (Hayes & Westrup, 2012), it requires addressing local resource availabilities, working practices and culture, often referred to as "bricolage" (Ciborra, 1999; Foster & Heeks, 2013). Scaling involves processes of cultivation and is characterized by incremental and evolutionary approaches, which in turn form a part of bricolage (Braa & Sahay, 2012). In addition, bricolage as a scaling approach encourages flexibility and adaptation, which are crucial for ICTs to be scaled from one location to the other (Braa & Sahay, 2012).

Bricolage draws its roots in the anthropology literature. It is based on the term "bricoleur" proposed by the French anthropologist Levi-Strauss (Levi-Strauss, 1966, Pg.17). He referred to bricolage as a particular way that bricoleur engage in a dialogue with the resources and the environment, making do "with whatever is at hand" and "creates something out of nothing" to generate new solutions and reconfigure existing resources for new purposes. More recently, theoretical advances on the bricolage literature have uncovered two key differences between the original conception of "bricolage" and the more recent depiction of "bricolage".

First, in the initial version of bricolage as illustrated by Levi-Strauss, the bricoleur is a solitary figure as opposed to the recent portrayal of bricolage as a collective process i.e., collective bricolage. Second difference pertains to the repertoire of resources that the bricoleur has. In Levi-Strauss original piece, the repertoire was seen as limited and closed; while recent studies have highlighted that the bricoleur's repertoire is dynamic and evolves overtime (Ravishankar, 2016).

Baker & Nelson (2005) demonstrate that bricolage provides survival opportunities to new firms during the periods of low resource stocks. Furthermore, in competitive markets and declining resource stocks, bricolage increases the chances for the survival of firms, as competitors that work with appropriate levels and types of resources may skip opportunities, or otherwise exit the market.

In addition, social enterprises in developing economies are often exposed to an environment in which valuable resources are scarce and expensive (Zahra et al., 2009) and in some cases, institutional financing mechanisms are absent (Mair & Marti, 2009). Bricolage is considered as an effective response to circumstances that are unpredicted and often surprising (Ciborra, 1996; Owusu et al., 2013). Bricolage is therefore considered a response to different kinds of resource scarcity implying that when faced with constraints the bricoleur utilises resources at hand to deal with the resource constraints (Halme, Lindeman, & Linna, 2012).

Bricolage is defined as *"making do by applying combinations of the resources at hand to new problems and opportunities"* (Baker & Nelson, 2005, Pg. 333). This definition identifies the three key elements of bricolage: " 'making do' which indicates active engagement with problems and opportunities; relying on 'the resources at hand' in particular those that are readily available or cheap and the combination of resources available for new effects and

purposes". Entrepreneurs make use of a diverse variety of resources at hand: they engage in bricolage with regard to *"customers, existing networks, institutions, financing, suppliers, office space, advice, and employees"* (Baker, Miner, & Eesley, 2003; Halme et al., 2012; Mair & Marti, 2009; Oliver & McKague, 2009).

Bricolage assists social enterprises develop new capabilities and eases the resource constraints and even sees them as an opportunity to scale (Di Domenico, Haugh, & Tracey, 2010; Owusu et al., 2013; Phillips & Tracey, 2007). However, Baker & Nelson (2005) contend that although ventures using bricolage are able to create thriving small businesses, these ventures are limited in their growth potential. Bricolage based on material resources (resource bricolage) is considered effective at creating 'something from nothing' in very challenging environments, but it may prevent a venture from scaling, for example, into new geographic markets or user bases (Desa, 2008). Thus, resource bricolage can help social enterprises to start-up and mobilize resources in the initial phases of scaling, but as argued by (Mair & Marti, 2009; Oliver & McKague, 2009; Desa, 2008), other forms of bricolage such as collective bricolage (i.e., participation of external stakeholders), network bricolage and institutional bricolage are crucial for social enterprises to achieve scale.

Thus, both resource bricolage and collective bricolage enable ICT social enterprises to achieve scale, albeit in different ways. For example, as demonstrated by Desa (2008), Bookshare.org, an ICT firm started out with an initial user-base of blind, tech-savvy users with an interest in computer books. Using bricolage, it started its services making do with pre-existing materials at hand such as computers, existing software, scanners and screen-readers that were obtained from the old Arkenstone project (Desa, 2008). However, its growth depended upon the literary content provided by volunteers and donors and through an

agreement with the O'Reilly Publishing Company, it obtained access to an entire collection of books on computer software.

I now explore how scaling was achieved with the help of bricolage by an ICT social enterprise in India.

2.3. Research context and methodology

India is an appropriate research setting for this study. It is an infrastructure-challenged country implying that the financial and technical infrastructure is inadequate and it is also strongly governed by the financial regulator (Knowledge@Wharton, 2013). The telecommunications industry structure and the socio-cultural traits are different among different developing countries and impact the organization of the mobile money market (Dahlberg et al., 2008).

Our Indian setting makes an interesting comparison with the well-known case in Kenya where successful mobile payment solutions have been provided by M-Pesa (Hughes & Lonie, 2007; Mas & Radcliffe, 2011). The mobile operator Vodafone, for example, was successful in Kenya but not in India. While Safaricom, the mobile network operator (MNO) of M-Pesa, had a dominant role in terms of a large market share (around 80%) (Mas & Radcliffe, 2010), in India there are 10 major MNOs (Gupta & Tahilyani, 2013) making interoperability a major issue in deploying mobile money solutions.

Furthermore, the cultural environment of India is very different and poses challenges such as the presence of multiple regional languages, low literacy rates and a high proportion of unbanked population. India has 18 official languages and two-thirds of the population in

India is illiterate (Goyal et al., 2012) and of a population of 1.2 billion, only 250 million have a bank account (Gupta, 2013).

Unlike Kenya, India is strongly governed by the financial regulator (the Reserve Bank of India (RBI)). For example, in India, mobile money solutions require the participation of a bank to enable cash withdrawals (a requirement of the RBI) and thus the providers have to partner with banks (Gupta & Tahilyani, 2013). Despite these constraints, some start-ups have been able to launch mobile money solutions. However, dealing with these constraints implies that the independent players have to first put a mobile banking infrastructure in place and then provide for mobile money solutions.

Despite these differences with the context of M-Pesa, the Indian case study company chosen has also been successful. Alpha India Financial Services (referred to as 'Alpha') is an India-based start-up launched by two partners with 0.5 million dollars donated by family and friends in 2007. Alpha is now a growing mobile money network of 3 million customers, 3000 agents, 3 micro financial institutions (MFIs) and 4 banks that cover banking, payment and money transfer services. They have processed over 30 million transactions valued over US$2.5 billion in the period 2007 to 2014 (Alpha, 2014).

Alpha functions as the business correspondent (BC) to three major banks in India and provides mobile banking and mobile money transfer services through its platform Simplibank. A BC is essentially an intermediary between the banks and the end users and provides banking and financial services to customers. As a BC, Alpha opens accounts for the banks and enables the account holders to carry out financial transactions such as deposits and withdrawals from their accounts on their mobile phones at neighbourhood local grocery

stores (*kiranas*), stationery stores, petrol pumps and pharmaceutical shops. A representation of the BC model with Alpha acting as the BC is depicted in figure 6 below.

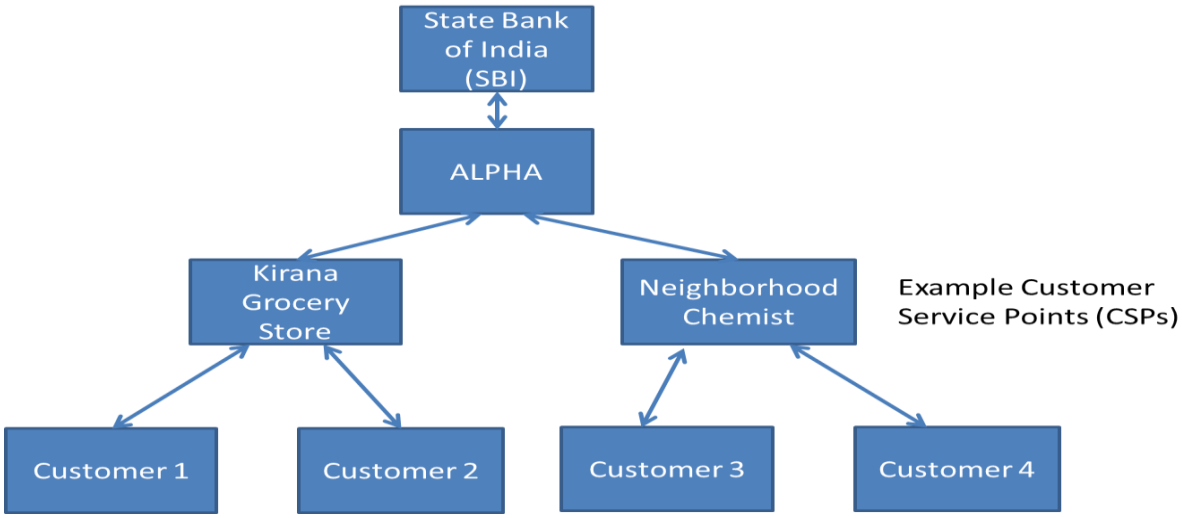

Figure 6: A representation of Alpha as the business correspondent

In order to analyse the Alpha case, we principally adopted a qualitative approach based on primary and secondary data. The study uses an exploratory case study design with multiple sources of evidence (Yin, 2008), including interviews, observations and archival material. The diversity of data sources and respondents was intended to allow for consistency checking and to minimize the risk of retrospective rationalization (Eisenhardt, 1989). Semi-structured interviews and field observations were the source of primary data. We interviewed actors within the mobile money network, that is, those involved in the scaling of Alpha. We also took advantage of the secondary evidence available to examine the history and scaling process of this ICT social enterprise.

In terms of primary data, 45 interviews were undertaken from July 2013 to May 2014 with a number of actors directly related to Alpha. These consisted of top management executives (4), operational employees (6), agents (10), independent consultants associated with the project roll out (5) and other system actors including representatives from MFIs, banks and

competitors (10) and customers (10). We have signed a confidentiality agreement with the company and thus I use fictitious names for our respondents in the interview citations made in the next section.

The interviews were conducted face-to-face from July to September 2013 and in December 2013. Further interviews were conducted over Skype from January 2014 to May 2014. Each interview lasted around 40 to 45 minutes. The confidentiality agreement prevented taped recordings of the interviews, but I was allowed to take detailed notes which were transcribed immediately after the interviews. I used snowball sampling (Eseryel & Eseryel, 2013) so as to capture the organization's partners and competitors as seen by neutral parties such as experts and independent consultants. To avoid bias, I interviewed representatives from Alpha's competitors, industry experts and industry consultants who are involved with both Alpha and its competitors (thus, viewed as neutral), as well as employees of Alpha. This strategy was important in order to avoid interviewing only insiders working directly with Alpha. The focus for the interviews was to understand the challenges and problems faced and the operations of Alpha that underpinned scaling, and in particular to understand the roles of institutions and the different actors in the innovation and scaling process. Given that the primary customer base for this ICT innovation consisted of BoP customers, I interviewed and observed stakeholders operating in both rural and urban areas.

I also spent two weeks at the sites of ten agents observing the pattern of interactions. At each agent's site I observed the manner in which customers carried out the transactions, the purpose of the transactions and the kind of customers that frequented the site most. Following this, I identified customers that were willing to be interviewed. Agents, along with customers, were then interviewed.

Considering the longitudinal perspective required to investigate the process of scaling ICT-based innovation, I accessed the secondary documentation that is available on Alpha. While direct, on site involvement helped gain a unique insight into the everyday activities and challenges of Alpha's agent network, the archival sources were equally relevant to understand Alpha's vigorous and at times, bumpy ride to achieve scale over the 7-year period.

I have drawn on reports and publicly-available statistics amongst other material. To give an example, I gained useful insights about the field through the reports published by two organizations: The Consultative Group to Assist the Poor (Flaming, McKay, & Pickens, 2011) and MicroSave (Laureti & Matthews, 2009).

Both primary and secondary data were used in the account of scaling and innovation that follows. The data analysis was conducted in three steps. The first step began with the main focus on how Alpha and its partners experienced scaling. Following this step, a timeline was developed tracing the key events and the focal actors in the scaling process. This timeline is presented in the discussion section.

In the second step, I started analysing interview codes using an abductive approach by which previously identified phases of scaling informed our otherwise open coding work. Specifically, I drew on the work of Foster & Heeks (2013) which identified five phases to scaling: "pilot/exploratory scoping", "incremental rollout", "aggressive growth", "standardisation" and "functional expansion".

During this second step, I identified a reflection that was made by all representatives from Alpha, which seems to conflict with the phases identified by Foster & Heeks (2013). This concerns leveraging existing resources, recombining resources, de-scaling of products,

reducing technical functionalities, dealing with tight regulations and contraction of firm's stakeholder network during the process of scaling. This is related to bricolage and distinguishes our case from previous studies of scaling. In our case the lead actor is a third party ICT social enterprise that faced several resource challenges while scaling up.

The third step involved organizing these codes into aggregate theoretical dimensions and was achieved by alternating between the textual content of the codes and relevant theoretical concepts. For instance, first order codes such as leveraging the existing infrastructure were aggregated as the 'bricolage of things' whereas getting into partnerships with existing organizations in different geographies was aggregated as 'bricolage of people'. Furthermore, a code such as collaborating with competitors was defined as co-opetition. In addition to finding instances of scaling phases, I also found instances of de-scaling and re-scaling. For example, the removal of technical features of the system, reducing the system to fewer areas or removing a functional area where the system was being used were coded as de-scaling.

Amongst our most important key finding is that resource bricolage forms an important phase in achieving scale. However, resource bricolage is not sufficient to achieve scale, rather it is other forms of bricolage such as collective bricolage, institutional bricolage and network bricolage that make scaling feasible. In addition to the findings of Foster & Heeks (2013), I observed phases of re-scaling and de-scaling during the scaling process in our case study These differences in our observations on scaling compared to the findings of Foster & Heeks (2013) may be due in part to the differences discussed earlier between the Indian context and that of Kenya. I discuss these key findings from our case in the next section.

2.4. Findings from case analysis

In this section, I discuss the scaling process, from 2007 to 2014 that eventually led Alpha to become a well-recognized player in ICT for BoP customers. First, I provide details about the mobile money system designed by Alpha. Following this, I discuss the different phases in the scaling process.

Alpha provides a low-cost financial services infrastructure to extend the reach of financial institutions (mainly banks, both public and private sector) to the unbanked in urban and rural areas of India. The company targets customers such as housemaids, auto rickshaw pullers and vegetable vendors who have low income levels and do not have access to the conventional banking system. The customers can deposit, withdraw or remit money by simply composing and dialling a sequence of numbers on their mobile phone. There is no need to compose messages thereby taking into account the problem of illiteracy and the presence of multiple languages in India. Furthermore, the dialling of this sequence of numbers is treated as a 'missed call' so that the customer is not charged for the call. In addition, the mobile number serves as the bank account number of users in this business model so that it can be recalled easily.

In figure 7, I show a person-to-person (P2P) payment being made to another user through the mobile phone. The sender dials the following string from the mobile phone: *543* signifies that the transaction belongs to Alpha; *9812345678* is the user's account number or the mobile number; *999* is the transaction amount and *1620* is the one-time password. This password is obtained from a booklet of codes that is provided to the customer upon his registration. The sender then presses the call button and there is no charge for the call.

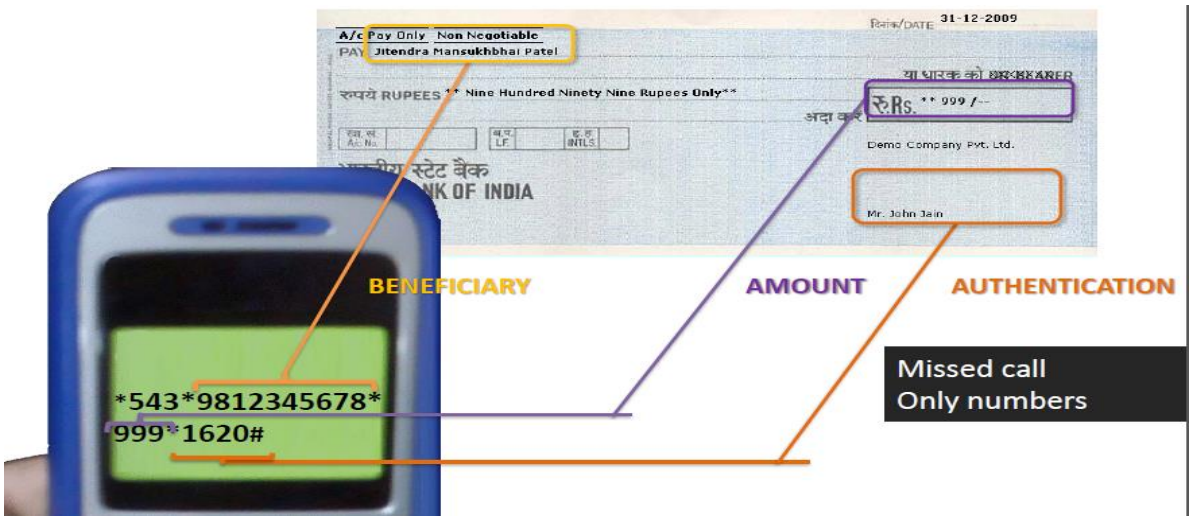

Figure 7: Mobile payment with Alpha

Our analysis of data suggests that the scaling of Alpha can be understood as composed of seven key phases. These phases can be differentiated on the basis of three main elements: the kind of bricolage involved, the portfolio of products and services added over time, and the relations of key stakeholders involved in Alpha's network.

2.4.1. Pilot and exploratory scoping

In 2006, the regulator (RBI) issued the business correspondent (BC) model directive which enables organizations to offer ICT-based innovative products aiming at financial inclusion. There were specific guidelines and requirements regarding functioning as a BC. Alpha, as a social enterprise had both social development (helping the BoP and those who are disenfranchised and excluded from the formal economy) and business goals (to grow profitably). Regulations do not permit third party actors such as Alpha to provide mobile money services on their own; they must do so in a partnership with a bank. This implies that Alpha finds relevant stakeholders in banks who can appoint them as their BC. Further, it

means that Alpha had to construct its distribution network from scratch. It also relies on funding and grants from venture capitalists and funding associations. As Manavsi, VP, international business explains:

When we started, the environment was too restrictive. The constraints slowed down the pace of progress. Venture capitalists do not give funding to NPOs. It has been a problem to obtain additional funding.

Even though, this initiative came as the owners contributed initial money towards the business, the adoption of Alpha's platform was unsuccessful. In this pilot phase, factors such as regulatory restrictions, failed partnerships and lack of interest by the stakeholders jeopardized the efforts of Alpha to grow.

Restrictions on the fees and charges on services made it extremely difficult for Alpha to generate a stable source of revenue. For example, RBI required that BCs do not charge customers a fee for transactions and thus Alpha relied on the partner banks for reimbursements. Another reason for failure in this phase was the lack of interest by banks that saw this service as a corporate social responsibility activity rather than as a viable line of business. As Digvijay, an independent consultant in mobile banking who works closely with Alpha argues:

Banks earlier thought of the account opening activities as a mere corporate social responsibility activity. They do not even consider the BoP customers as a viable customer base...more as a liability.

In 2008, Alpha entered into a partnership with ABC Bank to open no-frills accounts (Gupta & Tahilyani, 2013). This fell through after the latter merged with Pegasus Bank and Alpha

found itself again in difficulty. Alpha had to close down all the accounts it had opened for the bank. Much effort had gone into offering this service and the failure drained much of its funds.

Another partnership that failed was that with Airtel, an MNO for unstructured supplementary service data connectivity. Alpha leveraged Airtel's network of 1.2 million outlets (Flaming, McKay, & Pickens, 2011), trained the MNO staff and provided the back-end technology and support. The partnership failed for two main reasons, as elaborated by our informants. Manavsi , the VP, International Business and Nitin, an independent consultant mentioned, First, Airtel agents received *"a higher commission for its recharge and airtime-selling business than Alpha provided, so CSPs had less incentive to promote the Alpha-ABC product."* and Second, *"Airtel, back in 2009 as an MNO was not legally allowed to issue a mobile wallet or put their brand on a financial product. Therefore, the agents did not have a sense of ownership of the product."*

Bricolage is employed in technological entrepreneurial activities and by social ventures (Desa & Koch, 2014; Garud & Karnøe, 2003). "Resource hijacking" is a bricolage technique that entrepreneurs engage in to develop enterprises using resources controlled by others such as the internet as it allows for cost reduction (Daniel, Di Domenico, & Sharma, 2015; Stritar, 2012). Internet entrepreneurs employ different types of resource hijacking in order to overcome the limits in the resources they control and design services along those resources (Baker & Nelson, 2005; Stritar, 2012). For instance, Hotmail engages in marketing and social network hijacking as a form of resource hijacking (Stritar, 2012). As put by Stritar (2012, Pg. 10), *"At the bottom of each email there was a 'get your own free Hotmail account' link implying that with each email sent through Hotmail promotion was done with no additional expense and thus each user became an involuntary marketer promoting the service within her*

social network". Our case company, Alpha also engaged in a resource hijacking bricolage behaviour whereby it made use of Airtel's agent network to distribute mobile money services. However, it did not succeed in starting the venture and the partnership failed.

2.4.2. Resource bricolage

Following the results of the pilot, scaling began with new stakeholders and with the creation of its own distribution network. To build its distribution network, Alpha engaged in resource bricolage. Bricolage is considered as an appropriate response to venture growth in low income settings as it focuses on engagement with local resources and expertise (Baker & Nelson, 2005; Duymedjian & Rüling, 2010). This phase saw Alpha engaging in bricolage with regard to customers and agents, and creating new combinations of the resources at hand. For example, lack of access to a formal banking infrastructure enabled Alpha to tie up with existing kirana stores as CSPs. In resource constrained environments, social ventures rely on bricolage to construct resource environments and reject institutional constraints (Duymedjian & Rüling, 2010; Mair & Marti, 2009).

Resource bricolage is composed of three set of actions (Baker & Nelson, 2005; Senyard, Baker, & Davidsson, 2011). The first consists of using resources at hand, wherein, Alpha leveraged the existing network of local retailers targeting the local grocers and pharmacies in the neighbourhood. The second component of resource bricolage involves combining existing resources for new purposes. Thus, Alpha combined existing networks of local retailers and reconfigured them to function as its network of agents called customer service points (CSPs). In addition to the profits from their retail activity, these CSPs earn a small income from the mobile transactions. These CSPs are the most trusted in any given locality as the customers

visit them on a daily basis for purchasing food, medicines and airtime cards. In addition, they are open for long hours whereas banks are functional for only a few hours each day.

Partnering with these kiranas has helped us achieve scale as they have their own customer base. Kiranas promote our products to the customers, inform them…teach them how to do transactions and are the most trusted people in the locality (Manavsi, VP, international business).

The third component of resource bricolage is the continuous testing and enactment of limitations (Mair & Marti, 2009), whereby entrepreneurs *"disregard the limitations of commonly accepted definitions of material inputs, practices, and definitions and standards insisting instead on trying out solutions"* (Baker & Nelson, 2005, Pg.34). Thus, organizations employing bricolage negotiate actions and meanings in context. Bricolage is negotiated in context by local participants who conceptualize possible solutions suited to local problems. For example, CSPs have altered the customers' perceptions of their roles and identity over time from local grocer to local banker, human teller and promoter of Alpha.

Shyamji bhai shop (a local grocer) is just a few steps away from where I sell flowers and it is my bank (Kishore, florist).

In addition, many of the CSPs perform 'know your customer' and anti-money laundering inquiries and investigation functions as they already know the customers (normally, such inquiries are performed by banks). Thus, Alpha CSPs act as banker, human teller, trainer and promoter of Alpha products.

Alpha started its operation as a BC of the State Bank of India (SBI). SBI, the largest state-owned bank in India, appointed Alpha as its official BC in February 2009. Alpha initiated

operations with the launch of the no frills 'SBI Mini Savings Bank Account', under the slogan "Khata kholo har darwaza kholo" (open an account, open every door) at Uttam Nagar, New Delhi (Laureti & Matthews, 2009). These enabled account holders to carry out financial transactions such as deposits and withdrawals using their mobile phones at neighbourhood local grocery stores, stationery stores, and pharmaceutical shops.

During this phase, the majority of Alpha's users were at the BoP, that is, those who earned less than US$2 a day (Prahalad & Hart, 2002) and were excluded from the formal banking channels. The definition of BoP has been extended to include individuals who are disenfranchised and may be marginalized because of race, religion, gender, disability, and location (Malik et al., 2013).

Although this phase witnessed stability for Alpha in terms of its agent network and other stakeholders, the financial aspects remained gloomy. Firstly, the economics related to the structure of margins for no frills accounts was not favourable to Alpha. When the partnership started, SBI paid Alpha 10 rupees for every account sourced, whereas Alpha paid 30 rupees to its CSP[4]. Secondly, all operational activities (for example, the identification and training of CSPs, monitoring and fraud detection, quality control and customer support) and marketing expenditure (for example promotion, financial education and a call centre) were borne by Alpha. SBI did not cover such costs. This had a significant impact on Alpha's scalability in terms of profitability and generating revenue streams. Therefore, the no frills account opening proposition did not come as a profit-making one for Alpha.

[4] The information mentioned here was provided to the author by representatives from Alpha. However, some sections of it are also available in public domain at http://www.termpaperwarehouse.com/essay-on/Branchless-Banking/90679

Initially we invested a lot in building our customer base both in rural areas such as Bihar and Jharkhand and in urban areas such as Delhi. We had to establish agents in both rural and urban areas (Alok, business development manager).

In addition, SBI viewed the alliance more as a tool to comply and meet the RBI's financial inclusion targets rather than a beneficial business partnership.

Banks have to fulfil their financial inclusion targets… They do not want to get involved in the hassles so they ask us to open accounts for customers in the villages that are still unbanked (Manavsi, VP, international business).

Further, the banks took a long time, almost three years, to integrate the no frills accounts sourced through Alpha into their core banking systems. This implied that an Alpha customer was disconnected from the existing customer base of the bank at that time and could not transact with these customers.

There has been slow progress allowing technology to catch up with the regulations in place restricting us from innovating faster. For example, I have an account outsourced through the bank i.e., SBI and my maid has acquired an account through us i.e., Alpha. I cannot pay her on my mobile. I need to take out cash and pay her in cash… there is an 'island' of customers who cannot use the existing banking infrastructure (Manavsi, VP international business).

As Alpha witnessed increases in terms of its agent network, new issues related to channel management appeared.

When we started to set up CSPs we were trying to enrol a lot of them. That did not always work. In some cases, the CSPs ran away with customer cash. Then we realized we needed to enrol and train agents selectively and not on an ad hoc basis (Shalini, area sales head).

2.4.3. Incremental rollout and extended pilots

Following the new challenges exposed in the channel management during the previous phase, Alpha set out to revise its agent network structure by transforming the agent selection process. Subsequently, Alpha adopted strict procedures for selecting agents. Alpha enrols CSPs based on the location, business experience, financial stability (typically ones that have multiple sources of revenue), and their willingness and ability to compile forms, interact with customers and explain the product to users.

The whole CSP selection process was transformed…We got them to fill in the forms and each form was then evaluated. One key criterion for us is that the CSP should have at least 2 to 3 years of business experience in the locality (Manavsi, VP international business).

The not so lucrative economics of the no-frills account and the daunting task of setting up networks of agents and customers at both sender and receiver ends proved fundamental in introducing innovation in this phase.

We did pursue with setting up CSPs at both ends at the start. But, setting up both the ends of the remittance pipeline was a huge exercise. We realized doing this requires a significantly large base of agents on the sending and receiving side, greater efforts to educate people on both sides and significantly deep pockets. (Girish, assistant sales manager).

Alpha introduced a person-to-bank (P2B) remittance scheme in addition to existing person-to-person remittances. Alpha launched an instant remittance product known as ‘Tatkal’ with SBI in August 2010. Tatkal is an instant money transfer service that allows customers to deposit cash into any SBI account. The recipient only needs to have an SBI account for Tatkal to work. The sender visits the CSP with the cash to be deposited.

Alpha, by introducing this product engaged in institutional bricolage, i.e., leveraging institutions at hand, implies that bricoleurs play with what they have at hand, taking advantage of what the system offers at a given moment (Mair & Marti, 2009). Institutional bricolage signifies playing with old institutions and systems, simultaneously creating new ones based on old ones. This motivation for designing the 'Tatkal' product came through the need to include the existing customer base of SBI into Alpha's core system. In this way, Alpha expanded its user base from those excluded from the banking system to those who are included.

The objective was to include the already existing customers into our network. We increase the customer base and extend our reach to different geographic areas (Shalini, area sales head).

Additionally, the banks were supportive of this product as they managed to decongest the bank branches by redirecting the BoP customer to these CSPs. Jitesh, a CSP who owns a kirana store clarifies further:

Many people come to my shop to send money…They are poor people who are often insulted in the branches…The banks do not want to deal with them as the transaction amount is low. They come to my shop and I treat them well as I do when they come to buy bread and butter. More customers come to my shop as the bank itself sends customers to my shop.

This product has been a profitable stream of revenue for Alpha. As of September 2011, Alpha had processed transactions amounting to 8 billion rupees with 1.6 million transactions. Tatkal, became a popular offering enabling Alpha to double its revenues, reduce its operating losses to 16 percent of revenue (in 2011) and achieve breakeven (in 2012) (Chen, 2012).

Figure 8, adapted from Lahiri & Mehta (2011) depicts the growth in the number of transactions and total volume of money processed from August 2010 to March 2011.

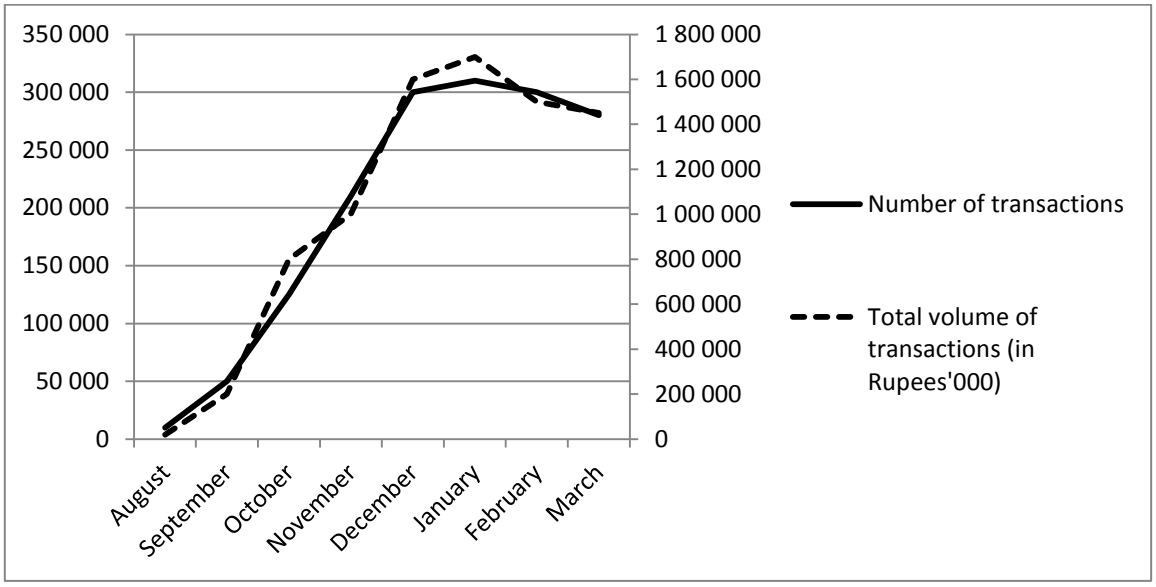

Figure 8: Number of transactions and total volume of money processed through Tatkal

Figure 9, adapted from Sadana & Wright (2011), presents the uptake of the Tatkal product among the customers (depicted by solid black axis) and among the CSPs (dotted line axis) from September 2010 till February 2011.

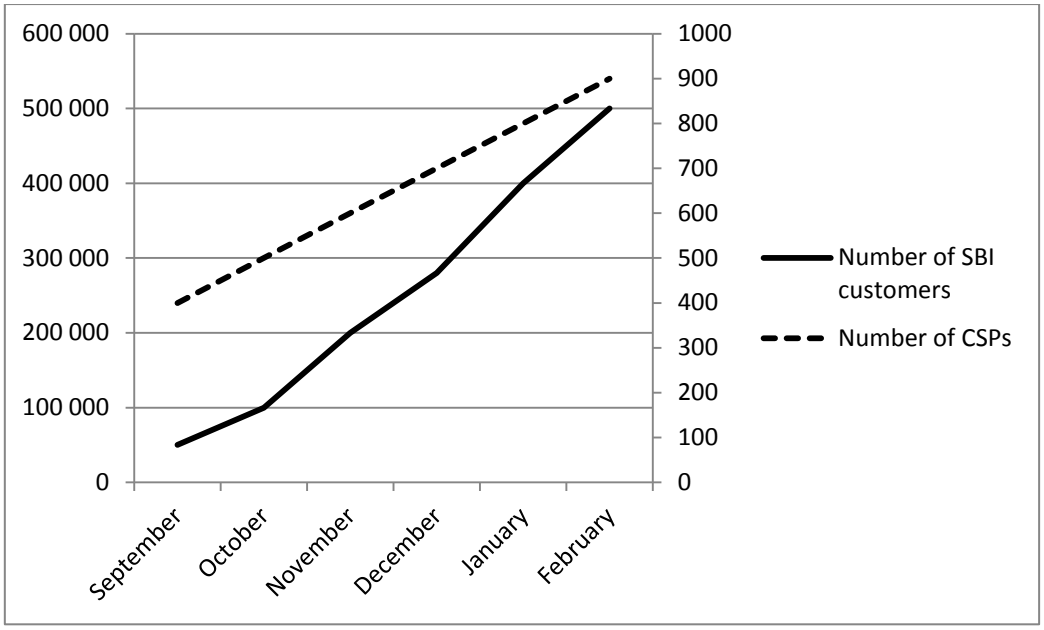

Figure 9: Uptake of the Tatkal product among customers and CSPs

Another form of institutional bricolage evident in this phase was partnering with existing institutions in different geographies and different product categories. For example, Alpha partnered with the ANA life insurance company and rolled out ANA Life – Jeevan Bima, an insurance product. ANA leverages Alpha's platform to collect the insurance premium and to grant life cover for micro insurance products. Another pilot project was initiated with the purpose of extending reach into rural areas. Alpha in collaboration with The Norway India Partnership Initiative and the Government of Bihar, initiated a pilot project to enable timely payments of accredited social health activist (ASHA) health worker's incentives in the Sheikhpura district of Bihar over its mobile money system in December 2010.

2.4.4. Aggressive growth

In response to the channel management issues related to agent selection and monitoring, and liquidity management, Alpha engaged in one particular kind of bricolage which is creating

new roles (Halme et al., 2012). In particular, it created a new role of Super CSP. Alpha followed a fast moving consumer good (FMCG) distribution model that is composed of wholesalers and retailers where wholesalers distribute goods to retailers and extend credit as well (Dholakia, Dholakia, & Chattopadhyay, 2012). The role of Super CSP is equivalent to a wholesaler in the consumer goods model. Super CSPs typically have a large business base in a locality and work as distributer of goods to the several retailers there.

In addition to the creation of new roles, Alpha engaged in network bricolage to further expand its distribution network. Network bricolage is defined as *"the combination or recombination of existing actors and resources into a formal or informal network to achieve social and financial goals"* (Oliver & McKague, 2009, Pg.4). In addition, it also implies *"dependence on pre-existing contact networks as the means at hand"* (Burgers, Senyard, & Stuetzer, 2013; Teoh & Wickramasinghe, 2011). This form of bricolage is prevalent in recruiting employees in universities especially in the field of science, hiring their own graduate students and academic staff members from their university laboratories as early employees (Baker, Miner, & Eesley, 2003). Furthermore, network bricolage emphasizes that entrepreneurs depend on pre-existing contacts as their primary means at hand. This form of bricolage is in contrast with "networking" and other behaviours in which entrepreneurs seek resources from strangers (Baker, Miner, & Eesley, 2003).

Thus, Alpha engaged in network bricolage by making use of the existing CSPs and upgrading those CSPs that had a large network of retailers to Super CSPs. The latter help to identify reliable CSPs (equivalent to retailer in FMCG model) and manage about 50 to 70 CSPs, take care of the cash management activities such as providing CSPs with a working capital float, and collecting extra cash from the CSPs. This additional role in the mobile money network streamlined the distribution channel for Alpha.

When I joined Alpha…I realized the product will have huge demand…In the last two years, the 50 retailers I had under me have joined Alpha as CSPs (Vivek, a Super CSP who owns a kirana store).

In addition to using pre-existing contacts, network bricolage fosters collective creativity and collective entrepreneurship from other members in the network (Oliver & McKague, 2009; Teoh & Wickramasinghe, 2011). Thus, agents introduced innovation in the service delivery process in response to complaints from customers about delays in getting messages confirming the money transfer and other technical errors. As one CSP mentioned:

Sometimes the system is down or the customer doesn't get a confirmation message about the transfer being done. I give the customer a paper receipt with the stamp of my shop confirming the transaction (Prakash, a pharmacy store owner).

Ramesh (who owns a grocery store), another CSP emphasized:

We maintain the record of all transactions in the register. It is not required by Alpha but I do it to ensure consistency between the transaction on paper and what is shown in the system. The company sells its product but then if problems arise no one comes to help us. So, we keep record of all the money transactions.

In addition, agents took on a more active role concerning unanticipated usages that occurred in this phase. For example, customers frequently checked their account balances and this increased the cost for Alpha (as Alpha, not the customers, is charged for this). Such phenomena also occurred in the case of M-Pesa. However, in that case, Safaricom, the lead operator, responded to such events by increasing the cost of balance checks (Mas & Morawczynski, 2009). This is not an approach suitable to BoP customers, so Alpha engaged

with its CSPs to address this concern. The CSPs encouraged users to check their balance on a timely basis for example, once at night and once in the morning, but not more often.

As Alpha scaled its operations, the focus in urban areas expanded to include those at the middle of the pyramid (MoP) in addition to those at the BoP. However, although a shift in focus to the MoP occurred, Alpha's customers in rural areas were mainly those at the BoP.

2.4.5. Functional expansion

By 2011, Alpha was well established in Delhi and in urban areas. To scale throughout India and extend its reach to more remote areas in India, Alpha entered into a three-way partnership with an MFI named Cashpor and with ICICI, a private sector bank, and started operating in rural areas. ICICI bank provides no frills accounts and deposit schemes such as fixed deposits. Cashpor clients, who are mainly poor women, use the Alpha service to access bank accounts at the doorstep. Thus for Cashpor, Alpha works as a technology provider resulting in enhanced convenience, along with reduced transactional and cash handling costs. The credit disbursal and recollection are done through the Alpha platform and thus the loan officers do not have to handle the process manually. The partnership with Cashpor helped Alpha to scale. In India, MFIs are not allowed to mobilize deposits, therefore for Cashpor, such a partnership led to a transformation from a credit-only MFI to an organization that provides a wide range of financial services (no frills accounts, cash withdrawals and deposits).

We do not have to acquire new customers. Cashpor has already an established customer base. We do not have to establish offices and enrol agents. Cashpor has loan officers that work with CSPs providing savings and deposit services to loan customers (Manavsi, VP international business).

Alpha has now partnered with three other banks. They are ICICI Bank, Si Bank and Ind Bank. In addition, Alpha collaborated closely with state governments for the disbursal of subsidies and government grants. Following the positive results of the pilot in Bihar, Alpha won a project by the Government of Bihar where it enables timely and end-to-end disbursal of health benefit allowances to ASHA workers employed under the National Rural Health Mission in the Pipalpura district of Bihar.

Along with expanding its stakeholder network, Alpha also expanded the technical functionality. In addition to the mobile interface, Alpha introduced smartphone-based applications and computer interfaces to enable CSPs and Super CSPs to carry out transaction in the manner they prefer. This phase involved collective bricolage as Alpha's system enabled the agent to carry out transactions with no investment in maintaining infrastructure such as computers and internet connectivity.

We ensure that CSPs do not have to make any additional investments in working with us. They do not need a Point of Sale terminal or internet connectivity. All that our agents need is a small amount in their bank account (Anoop, area sales manager).

Collective bricolage is a higher level of bricolage that involves participation of external stakeholders. This phase in the scaling process involved partnerships across different sectors such as banking, government and micro finance. The collective agency (Desa, 2008; Garud & Karnøe, 2003) of different banks, MFIs and regional governments moved this mobile money system beyond the initial market of SBI only customers, into a broader market of domestic remittances and mobile enabled banking in both urban and rural areas. As Alpha scaled its partnerships with different banks, the rhetoric changed from "Khata kholo har darwaza

kholo" (open an account, open every door) to "chutki mein desh ke kisi bhi khate mein paise bheje" (send money to any bank in the country in the wink of an eye).

2.4.6. De-scaling (start 2012-2013)

This phase involved reducing a number of functionalities and a decline in the number of agents associated with Alpha. In contrast to the previous phases, where Alpha was responsible for introducing innovation and creating an ecosystem of partners, in this phase the locus of activity shifted from Alpha to the CSPs and Super CSPs. Some of the agents, who were doing low business complained about the untimely payment of margins.

The past 2 to 3 months have been problematic. I do not get my margins paid on time. Earlier, I was told I will get it at the end of every month. But now it is delayed by 3 to 4 months and even when I get my margins, there are no details of how much margin I got on which transactions (RamRatan, a stationery shop owner).

In addition to this, there were frequent complaints about margins being lower. 6 of the 14 agents interviewed admitted to being paid lower margins than agents associated with other BCs. As one of the agents interviewed mentioned:

Earlier in my locality there were only a few CSPs, now there are more as competition is increasing. All sorts of risks are borne by me: wrong transactions, fake currency notes, cash handling. I do the maximum work but the margin is much less. I cannot survive only on this business (Aakarsh, a cyber café owner).

The problem of lower margins was even more problematic in opening no frills accounts. Agents (CSPs) were quick enough to understand that doing remittances offers a far better

income proposition than opening no frill accounts. As Amarinder, a CSP who owns a phone accessory shop explained to us:

You don't get anything in opening an account. Customers do not use it at all. They just need to transfer money. I don't receive much on opening an account. Too much paper work and no ROTI (return on time invested).

Following the issues of delayed margin payments and competition, some agents went offline and were not doing any transactions for Alpha. Furthermore, those who were still associated with Alpha were only doing remittances.

Competition had put Alpha in a problematic situation. RBI allowed MNOs and MFIs to enter the BC domain, leading to a crowded and competitive market. In India, a total of 95,767 BCs exist (Gupta & Tahilyani, 2013). Alpha faces stiff competition from BCs such as Oxigen and Suvidhaa. Competitors paid a higher margin to the agent and some CSPs have gone to them. Although Alpha enters into a formal contract with the Super CSPs and CSPs that prohibits the CSP to work as an agent for other CSPs, it has become more difficult to retain them.

Yes, we have lost some agents to competition – over one hundred CSPs. We do control them and there are certain regulations that prohibit an agent to be associated with multiple BCs. But there are always ways to get around regulations…Let's say an agent is associated with Alpha. Competitors A and B offer him a higher margin. So he makes his wife an agent for A and his son for B. And they all operate from the same shop (Manavsi, VP international business).

Thus, this phase involved de-scaling both in terms of products and in terms of stakeholders. Contrary to the previous phases that were characterized by specific instances of bricolage, we did not observe any direct examples of bricolage in this phase.

2.4.7. Re-scaling (2013-2014)

This phase saw focus regained on the no frills accounts due to an external impetus from the government of India in 2013 and 2014 on financial inclusion. In 2014, under the Pradhan Mantri Jan DhanYojna (Prime Minister Public Money Scheme), a campaign was launched to open zero balance accounts. CSPs took part in this campaign but the future of this re-scaling phase is uncertain. Again, I did not observe any form of bricolage in this phase.

As the co-founder of Alpha suggests:

"Opening new accounts is an easy thing, but there is no way the country is geared to service these accounts and keep them alive" (Lakshmi, 2014).

In addition, nearly 75% of the 10 million accounts opened under this scheme are dormant with no activity (Jain, 2014). Similar to the de-scaling phase, bricolage was not ancillary in this phase as the locus of activity shifted from Alpha and its agents to political policies. Political support is argued to be a key driver for re-scaling (Sahay et al., 2013), especially when it is provided by legitimate entities such as the government of India. However, political support alone is not sufficient to re-scale the system and eventually its adoption. In addition to the political support, support from other stakeholders such as CSPs is also essential to re-scale. This phase of re-scaling did not only reflect sheer political support, rather it was a case of political mandate wherein re-scaling ignored other issues such as lack of interest in opening no frills accounts. As Abhishek Sinha, the CEO of the company describes:

"Banks feel these accounts will not be viable. So, there is little interest in developing products. Banks offer a zero balance account and then a 1,000 rupees' average balance account. With zero balance accounts, banks often start charging per transaction, which is counter-intuitive" (Rajshekhar, 2014).

This phase implies a loop back to the initial phase in terms of the product and customer focus. However, we cannot rule out the possibility that this phase might trigger another phase of de-scaling as the majority of no frills accounts were dormant.

2.5. Discussion

Table 2 shows how Alpha's efforts at scaling resulted in the expansion and contraction of the stakeholder network and of the product basket. It represents the number of stakeholders and products over the period 2007-2013.

Years	**2007-2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Stakeholders	ABC Bank Airtel's agents as CSPs	SBI Bank Own CSPs	SBI Bank ANA Life CSPs SCSPs ASHA MFI	SBI, ICICI Bank ANA Life CSPs, SCSPs ASHA, Cashpor	SBI, ICICI, Si Bank CSPs, SCSPs ASHA, Cashpor	SBI, ICICI, Si Bank CSPs, SCSPs ASHA, Cashpor
Products	NFAs P2P transfer	NFAs P2P transfer	NFAs P2P, P2B transfers Jeevan Bima	NFAs P2P, P2B transfer Jeevan Bima	P2P, P2B transfer	NFAs, P2P, P2B transfer

Table 2: Gradual change in the product and stakeholder network of Alpha

Our findings suggest that scaling in ICT social enterprises is a longer process with pilots extending to longer periods. In addition, I also find instances of de-scaling to be important in the scaling process, wherein the firm loses some of its products and stakeholders (in the short

term apparently a loss but in the long term necessary for overall scaling). Furthermore, there are instances of re-scaling as well wherein those products that were earlier discontinued are rolled back out, albeit at the behest of regulatory interventions in our case.

I now discuss how different forms of bricolage were employed during the scaling of this ICT social enterprise.

Resource hijacking

In order to start operations, Alpha made use of a particular form of bricolage, which is resource hijacking (using resources controlled by others to extend the resource base and create new products and ventures (Stritar, 2012)). It attempted to leverage existing resources, for example, Airtel's distribution network. Although it made use of existing resources, such resources were not directly under its control as most of distribution network was under the control of Airtel. ICT social enterprises that lack access to financial resources in the beginning phase are more likely to adopt bricolage strategies. However, the study reveals that such strategies might not result in positive outcomes and even lead to failed outcomes (as in our case the pilot did not succeed) especially in conditions when the resources are controlled by rival firms (such as Airtel in our case), at least in the short term. Therefore, resource hijacking as a bricolage technique might jeopardize the scaling efforts of ICT social enterprises, especially if those resources are controlled by rival firms.

Resource bricolage

Firms using bricolage recognize different uses of resources and combine these resources in new ways to create products and services implying resource combination and reconfiguration (Garud & Karnøe, 2003; Mair & Marti, 2009). This study demonstrates that mobile phones were used as automated teller machines (ATM) and the kirana stores were used as human tellers. In addition, the mobile number was reconfigured as the financial identity of the customer. These three resources were combined to create a mobile payment system in place by the firm in our case study. In addition, I also distinguish between necessity-based bricolage and ideational bricolage. The findings validate the idea of necessity-based bricolage (Desa & Basu, 2013), wherein, ICT social enterprises may engage in bricolage out of

necessity because they cannot pay for the costs of other resources. The lead firm in our case could not afford setting up a network of bricks-and-mortar branches where mobile transactions could be carried out. Therefore, faced with financial constraints the firm decided to leverage the ubiquitous network of retail stores.

In addition to necessity based bricolage my study also lends support to ideational bricolage. Leveraging reputation built through its partnership with SBI and a proven record, this ICT social enterprise engaged in ideational bricolage to explore opportunities from a wider set of motivated stakeholders such as banks and micro financial institutions. Ideational bricolage is one kind of bricolage wherein firms intentionally use existing resources (such as established reputation) to develop new products and ideas (Carstensen, 2011; Desa & Basu, 2013). Thus, bricolage assists ICT social enterprises mitigate resource constraints and enables such ventures to explore opportunities to scale up operations (Di Domenico et al., 2010).

In line with Desa & Basu (2013) this study suggests that organizations with low prominence (such as Alpha in the initial phases) engage in bricolage as they have fewer choices in the resources they can acquire, while organizations with high prominence (such as Alpha in the latter phases when it emerged as an established player) have sufficient resources in its repertoire to include a range of bricolage strategies (for example Alpha took advantage of its technology platform and the reputation it built to expand its operations in other geographies and collaborate with other partners). Thus, organizations with high prominence are equally likely to engage in bricolage strategies as the ones with low prominence.

Institutional bricolage

In addition, this research also lends support to institutional bricolage and that successful social ventures need to engage in both resource and institutional bricolage to grow (Mair &

Marti, 2009). Institutional bricolage enhances support from existing institutions; for example, when Alpha introduced Tatkal for existing SBI existing customers it received support from the banks, which were earlier not supportive. Thus, I suggest that ICT social enterprises should engage with both the resources at their disposal and the institutional context. Those that focus exclusively on resources may find that the existing institutions do not offer support and the social structure obstructs the target group from benefiting. Those that focus only on institutions might exclude the target group. Furthermore, it is contended that new institutions are created out of and with the "ruins of existing institutions" (Mair & Marti, 2009). Thus, Alpha made use of existing institutions such as regional governments to extend its scope to different geographies by piloting projects in different regions with government support.

Creation of new entities/Network bricolage

My study validates the argument of Halme et al. (2012) that identifies the *creation of new roles* as a bricolage activity. This was particularly evident in our case as many CSPs became Super CSPs with a consequent role shift as Super CSPs only conduct administrative and float management activities. I also demonstrate how network bricolage played a crucial role in the expansion of the network, particularly in recruiting Super CSPs. It is argued that, "firms that engage in network bricolage incur delays as they wait for resources to become available" (Senyard, Davidsson, & Steffens, 2015, Pg. 864). However, my study also suggests that ICT social enterprises engage in network bricolage to expand. Alpha, for example, upgraded CSPs that performed well to Super CSPs.

Collective bricolage

In addition to other forms of bricolage, Alpha engaged in a higher level of bricolage: collective bricolage (with the participation of external stakeholders such as private banks and

regional governments). However, this study reveals that mere participation of external stakeholders is not sufficient to scale. More specifically, in the context of ICT social enterprises that need to scale their operations as well as the ICT systems to different groups of customers and locations, it is necessary that the stakeholders are able to integrate their existing systems with new ones at no significant additional cost. For example, other firms such as Cashpor were able to integrate easily with the system provided by Alpha. Thus, Alpha's system was not restricted to those stakeholders that had significant resources. This, I argue is the essence of collective bricolage as it enables stakeholders to extend their services with limited resources. Collective bricolage also proved advantageous for Alpha in a competitive and crowded market and especially when some of its CSPs associated themselves with competitors. For example, even though competition has intensified, Alpha still remains the preferred choice for many reasons. First, Alpha does not require CSPs to make a heavy upfront investment. Second, unlike its competitors who require agents to invest in point of sale terminals, computers and internet connectivity, Alpha enables its CSPs to work with minimum resources as the mobile money solution works with very basic mobile phones. This is crucial also in areas where there are electricity cuts for long hours. Thus, collective bricolage helped Alpha to keep its agents motivated amidst circumstances of intense competition.

Summarizing our results in Figure 10 below, I highlight the different forms of bricolage that were prominent in the seven phases. I do not argue that the phases follow each other in sequential order. I argue that the seven phases mentioned below were critical for the case firm to achieve scale. I also subdivide the phases according to the two different product categories that were more prevalent in each phase. For example, in the phase of aggressive growth and

de-scaling, major focus was on remittance and mobile money transfers (with limited focus on mobile banking).

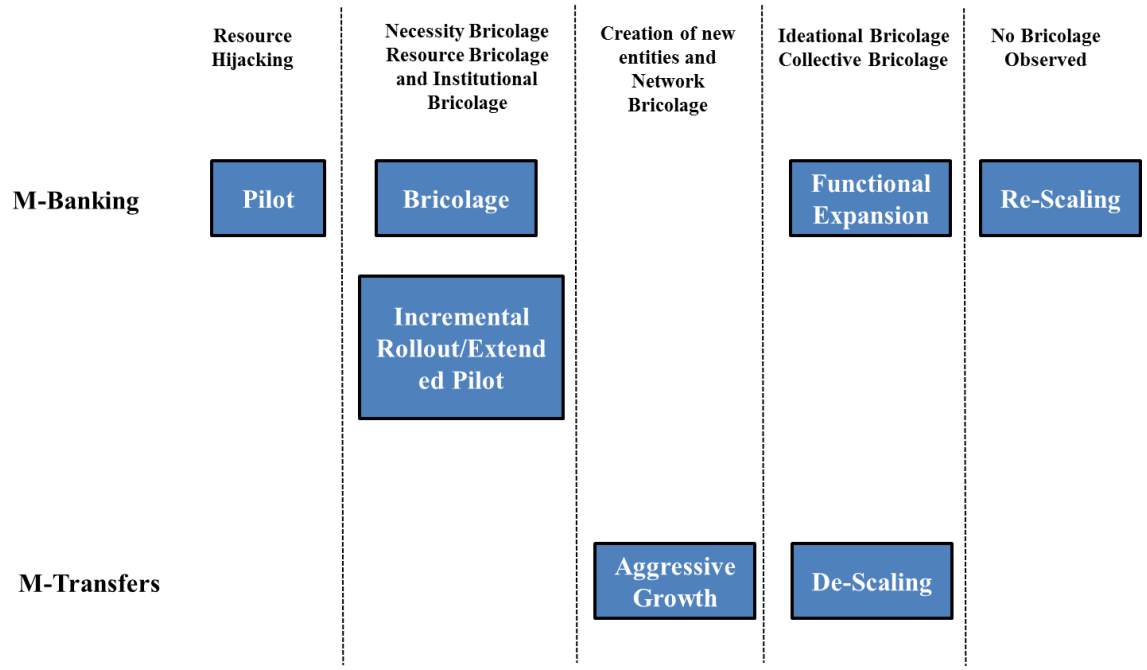

Figure 10: Bricolage and the seven phases of the scaling process
(M-banking: Mobile banking and M-Transfers: Mobile money transfers)

2.6. Conclusion

A growing number of intermediaries, particularly social enterprises, have played a crucial role in implementing market driven development through ICTs aimed at the BoP (Kuriyan et al., 2008). These social enterprises can be for profit or not-for-profit. ICT social enterprises face multiple challenges in scaling up. These challenges are related to finances and human resources in addition to external factors such as inadequate infrastructure. Thus current ICT social enterprises are not robust enough to be sustainable.

This paper focuses on understanding how ICT social enterprises achieve scale. Scalability is a key problem in the context of developing countries and particularly with ICT social

enterprises as they start with a social mission and face various resource constraints. Drawing on from the resource bricolage perspective, I illustrate scaling by investigating how Alpha leveraged existing resources such as the omnipresent mobile telephony, the potential of 50 million informal local kirana stores, and the existing relationships between the kiranas and customers. Our findings reveal that social enterprises which set out to initiate projects aimed at BoP need to consider different forms of bricolage. Those who focus only on one kind (for example, resource bricolage) might not gather support of existing institutions or make optimal use of the existing networks and indeed may fail because of this.

My study also suggests that as ICT social enterprises grow from pilot to full scale, they might deflect from their original goals as they achieve scale and expand. For example, although earlier users of Alpha's mobile money system were those at the BoP, later on the focus turned towards the MoP (in the aggressive growth phase). Our findings suggest that while the profit objective is critical to the scalability of ICT social enterprises, the social objectives are more pronounced during the initial launch of ICT projects (Sandeep & Ravishankar, 2015).

In addition, this research demonstrates that ICT social enterprises require a mix of services in order to scale up. For example, they need to combine low margin activities with the development of high margin added value products. Alpha for instance engaged in opening no frills accounts as well as in remittance based products that proved to be a profitable stream of revenue.

I also identify the different phases that an ICT social enterprises might pass through to achieve scale. I demonstrate that through a combination of different forms of bricolage such as resource and institutional bricolage, creation of new roles and entities and network bricolage, and collective bricolage, ICT social enterprises can scale and grow despite

resource limitations. Scaling in our case turned out to be a longer process (consisting of 7 phases) as opposed to the 'classic' 5 phases when the lead is taken by established firms (Foster & Heeks, 2013).

The longer process could be attributed to certain key factors. One key constraint that impeded the scaling initiative was the presence of regulatory constraints and the banks' slow progress and lack of willingness to design suitable products. The factors that promoted the scaling process were effective partnerships with actors such as kiranas, MFIs and banks.

This study also lends support to the argument that ICT innovations at the BoP reduce market separations (Tarafdar, Anekal, & Singh, 2013). For example, Alpha, by partnering with banks and MFIs in rural areas, not only reduced financial separation (providing loans, savings accounts and deposits) it also reduced temporal separation (timely exchange of products and services between customers and producers). For example, the poor women at Cashpor can now withdraw and deposit money in their villages anytime.

Finally, it is argued that there is little understanding about how social ventures scale the impact (Desa & Koch, 2014). I demonstrate this by engaging with local communities such as MFIs and local kiranas, Alpha achieved depth impact (different services such as loans, subsidy and deposits in a single area) and breadth impact (same set of services such as no frills accounts and remittances across different areas).

My study presents certain departures from the previous studies on ICT innovation carried out in the context of M-Pesa. The first point of departure is the existence of a large network of agents who sold airtime for Safaricom, the lead MNO and acted as agents/super agents for M-Pesa; a feature more difficult to replicate in other developing countries such as India (Camner & Sjoblom, 2009). In our case, such a wide network of agents was not present and even when

Alpha tried to enrol in the airtime agents (that belonged to Airtel), the effort did not succeed. Thus, Alpha relied on pharmacy stores and grocers who were not associated with MNOs. Another difference is the relationship of Safaricom and the regulator, or fewer regulatory restrictions that enabled M-Pesa to scale quickly and restricted other competitors such as Zain or existing commercial banks until M-Pesa became dominant in Kenya. In our case there were clear guidelines and restrictions on who can participate, the charges that can be levied, and the geographical area where they could operate. In addition, RBI made the market extremely competitive by allowing MFIs, MNOs and individuals to work as BCs for banks thereby making the market crowded.

Although I have elaborated on the contributions of my study, I was not able to interview the regulator and thus some factors were left undiscussed because of this. For example, the reasons for the compulsory inclusion of banks into the system remains unexplored.

The case represents a successful scale case where obstacles and challenges abound and highlights well the issues related to scaling in the context of developing countries such as India and BoP customers. Future studies could examine the cases that failed in initial years so as to generate more insights about scaling, along with other success stories, particularly those aimed at the BoP.

3. Paper II

Delivering ICTs to the BoP: The quest for appropriate business models

Abstract

Organizations, in their efforts to promote socioeconomic development for bottom of the pyramid (BoP) communities, are considering the democratic potential of Information and Communication Technologies (ICTs). Previous studies suggest that such initiatives can be impeded by barriers such as lack of sustainable and viable business models for the BoP. Business models (BMs) for the BoP markets tend to be different from the ones serving high income customers. Despite some agreement on the differences, there is limited discussion on the dimensions of the BMs appropriate for delivering ICTs to the BoP. Motivated by these shortcomings, this paper explores the BM dimensions that might prove useful to deliver ICTs. In doing so, we propose a V5BM model. This covers five value dimensions of the BM, a development from previous research. This research demonstrates that the BMs to deliver ICTs in BoP communities are built on five key value dimensions: value proposition, value network, value finance, value architecture and value co-creation. The V5BM dimensions are demonstrated empirically with the case of a mobile banking system implemented by a start-up based in India.

Keywords: Business model, Bottom of the pyramid, Information and communication technology, Value co-creation, India.

3.1. Introduction

The bottom of the pyramid (BoP) is frequently characterized by communities residing in geographically remote and rural areas that do not possess adequate access to physical and technological infrastructures (Vachani & Smith, 2004). In addition, the BoP includes individuals who are illiterate, economically deprived, and may be marginalized because of race, religion, gender, disability and location (Malik et al., 2013; Weidner et al., 2010). Evidence suggests specific interest of organizations (for example, producers and distributors) in BoP communities, primarily because organizations can provide price and culture-sensitive products and accrue socio-economic benefits to BoP communities profitably (Prahalad & Hart, 2002; Scott & Tarafdar, 2014).

Information and communications technologies (ICTs) are considered by many development agencies as critical to achieving socioeconomic progress for BoP communities (Lin et al., 2015; Walsham & Sahay, 2006). According to the World Bank, more than US$37 billion were invested between 1997 and 2007 in 400 small-scale ICT projects aimed at boosting social and economic development of the BoP communities (InfoDev, 2007; Lin et al., 2015). However, several studies have reported difficulties in realizing the potential benefits of ICT projects for the BoP (Avgerou & McGrath, 2007; Musiyandaka, Ranga, & Kiwa, 2013). Some scholars have suggested that the high failure rate of such projects is due to the problem of developing successful business models (BMs) to deliver ICTs to the BoP and this has resulted in many ICT projects being labeled as “dead pilots” (De Boer et al., 2013; Thapa & Saebo, 2011).

Critical views on the importance of the BM concept have been echoed by various scholars due to the inherent uncertainty and dynamic mechanisms present in BoP markets (Prahalad &

Hart, 2002; Sanchez & Ricart, 2010; Sinkovics, Sinkovics, & Yamin, 2014). In that specific context, it is argued that BMs are different from the conventional ones that serve high-income customers, as organizations have to act under conditions of particular uncertainty and change (Anderson & Kupp, 2008). Four elements that characterize the specificities of BMs for BoP markets are:

1. Serving the BoP involves introducing innovations both in the product and in the processes meant to deliver products (Foster & Heeks, 2013).
2. Organizations have to reconfigure BMs by adding new value propositions implying the dynamic nature of BMs. This characteristic is particularly crucial in the context of ICTs as they are flexible and allow for more emergent and unanticipated uses, by the end-users, by the lead firm, and sometimes by other actors within the value network (Foster & Heeks, 2013).
3. In many cases the BM content is not fully controlled by the lead firm.
4. The BMs for serving the BoP need to consider the specific characteristics that are different in BoP markets such as resource constraints and strong community relations (Banerjee & Duflo, 2007; Foster & Heeks, 2013; Mair & Schoen, 2007).

Delivering ICTs to the BoP requires collaborating with non-traditional partners (that exist outside the formal economy) and with a multitude of actors such as governments and nongovernmental organizations (Al-Debei et al., 2014; Karippacheril et al., 2013). In addition, as many ICT projects are funded by governments and donors and given the high failure rates of such projects, it is important to develop BMs that are sustainable and fit with the objectives of the project (Da Silva & Fernandez, 2013). Despite the agreement on the importance of developing viable BMs, there is limited discussion on what are the components and dimensions of such BMs. Given the complexities of ICT projects for the BoP that include

the specific nature of this market, the paucity of successful BMs, and the different actors involved in such projects, it is crucial to explore and understand the BMs that can be put in place to deliver ICT services to the BoP. This is the objective of this study and thus, leads us to our research question: *What constitutes an appropriate BM to deliver ICTs to the BoP?*

Based on the literature around BMs and value co-creation, my study demonstrates that the BMs to deliver ICTs for the BoP requires that stakeholders engage in value co-creation. I draw from the *"V4BM dimensions (the four value dimensions of BM: value proposition, value finance, value network and value architecture)"* proposed by Al-Debei & Avison (2010). I explore its main dimensions within the BoP and extend it to include an additional dimension of value co-creation.

The rest of the paper is structured as follows. In the next section I discuss the literature around business model and value co-creation, Section 3.3 presents the case description and methodology. In section 3.4, I present the key findings and discuss them further in the discussion section.

3.2. Literature review on business model and value co-creation

The Business Model (BM) concept can be regarded as a 'story' that explains how a firm works (Magretta, 2002). A business model (BM) is defined by Al-Debei, El-Haddadeh, & Avison (2008, Pg.8):

"The business model is an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well

all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives."

The BM concept emphasizes the role of resources and capabilities (Hedman & Kalling, 2003) but also considers other factors appropriate to firm performance such as external value networks and value creation (Al-Debei & Avison, 2010; Zott, Amit, & Massa, 2011).

The value creation perspective has evolved from a value-in-exchange perspective (value for customers is embedded in the product) to a value-in-use view wherein the value to the customers is generated by using products in a specific context (Zolnowski, Semmann, & Böhmann, 2011). Thus, users actively engage in value creation as they co-create value by customizing the product according to their needs.

The V4BM dimensions proposed by Al-Debei & Avison (2010) represent a comprehensive framework that identifies four key value dimensions. They are value proposition, value network, value finance and value architecture. Due to the differing characteristics of BoP communities, these dimensions could be interpreted differently. In addition to these four dimensions, recent studies have resonated the usefulness of BMs based on partnerships and value co-creation especially for organizations that are resource-scarce (for example, with respect to their sales team) (Kohli & Grover, 2008; Sarker et al., 2012). Such BMs can be particularly useful while delivering ICTs to the BoP as BMs necessary to serve the BoP are often beyond the present skills and knowledge of organizations (London & Hart, 2004).

The basis behind the concept of value co-creation is that the resources necessary to respond to the demands of the organization are not uniformly distributed and it is not possible to transfer these resources between different entities (de Reuver et al., 2009). Thus, organizations with different sets of resources can come together and create new value that

either organization is unlikely to create on its own. I use the 'co-creation' definition proposed by Sarker et al. (2012, Pg. 319): "*co-creation involves a symbiotic relationship between a firm and its primary stakeholders wherein the stakeholders (i.e., the focal firm with its partners or clients) customize and coproduce products/services."*

Value co-creation suggests that *(a) value is created and generated through actions of multiple stakeholders, (b) value emanates from collaborative relationships among firms and its stakeholders, and (c) structures and incentives for stakeholders to engage in and equitably share emergent value should be put in place* (Kohli & Grover, 2008, Pg. 28). The value co-creation perspective can be discussed from the resource based view (RBV) of the firm. Within RBV, resources are seen as *"stocks of available factors that are owned or controlled by the firm"* (Amit & Schoemaker, 1993, Pg.35). For instance, firms can jointly combine or exchange resources to create new sources of value (Barney, 2001). Thus, a firm's resources may span its boundaries and may lie in its relationship with other stakeholders. For example, a company that has a strong technological team may enter into an alliance with another company with a strong sales and marketing team to distribute the product (Sarker et al., 2012).

Given the specific context of the BoP, organizations innovatively build BMs such that critical resources (that they lack) are provided in a sustainable manner through the combined efforts of the value network (Mair & Schoen, 2007). In addition, firms serving the BoP markets often find that the BMs required to serve the BoP are beyond their present set of resources (London & Hart, 2004). Thus, organizations might consider this resource scarcity as a means to expand their value network by including the stakeholders who can provide complementary and supplementary resources, thereby obviating the need to engage in value co-creation (Mair & Schoen, 2007). Value co-creation in the context of BoP also reflects a social aspect of the

business model which is different from purely profit or business aspects. Organizations serving BoP often tend to combine both business and social objectives.

In the context of BoP, the value co-creation occurs among a multitude of actors that carry out multiple innovations to the products and delivery systems. The value proposition to the customer emanates from the joint efforts of the different stakeholders in the value network. In delivering ICTs to the BoP, the value network could be envisaged as an 'innofusion' network (a network of stakeholders that are the key source of innovations) (Foster & Heeks, 2013, 2014). This is crucial because in many cases the BM content is not fully controlled by the lead actor. For example, in the case of M-Pesa, Safaricom, the lead actor determined the timing and content of its strategic decisions, but the majority of innovations in delivery and in product were introduced by its agents and customers (Foster & Heeks, 2013).

Based on the discussions above, I propose V5BM dimensions (five value dimensions of BM) (see Figure 11 below) to deliver ICTs to the BoP. This could be considered as an extension to the V4BM with two key differences. First, I incorporated a fifth value dimension (value co-creation) to the V4BM. In doing this, I also argue that the value network engages in value co-creation and that the value proposition emanates from this co-created value. Second, considering the BoP markets, the value network is envisaged as an innofusion network. The remaining dimensions and the relationships among them are incorporated from Al-Debei & Avison (2011) and Panagiotopoulos et al. (2012). V5BM dimensions are an addition to the existing framework V4BM proposed by Al-Debei & Avison (2010). In figure 11 the two additional dimensions are represented in dotted boxes and the relationships are depicted by dotted arrows.

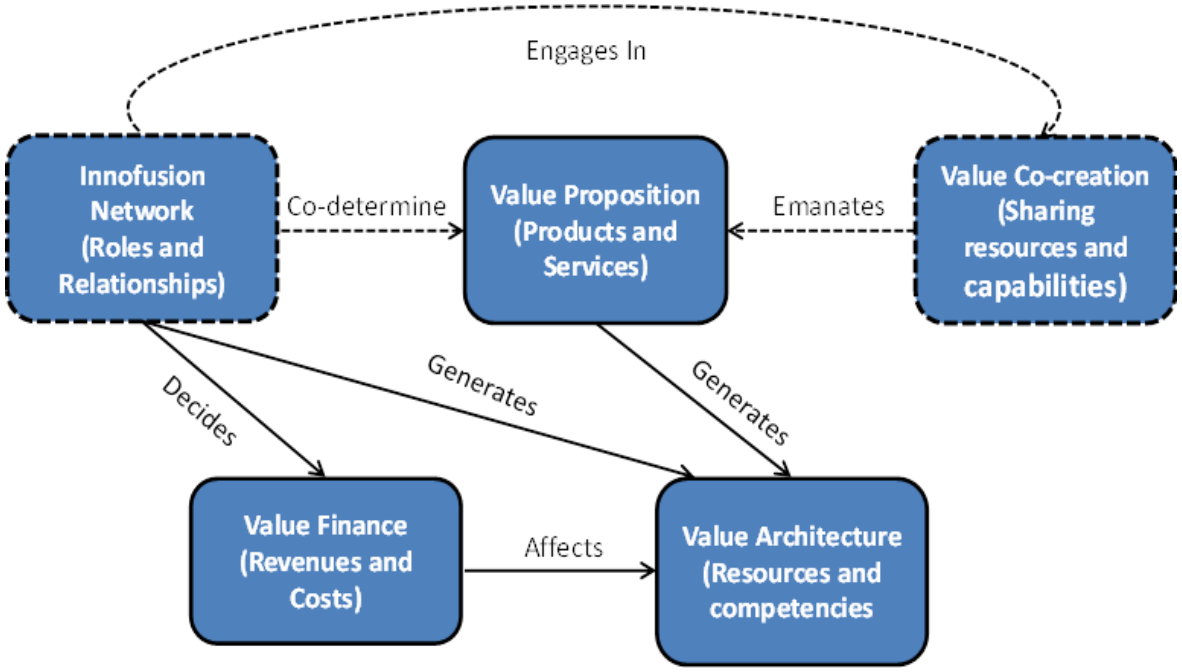

Figure 11: V5BM Dimensions for the BoP

3.3. Methodology and research context

Case settings

A case study method was selected (Yin, 2008). The single-case method is useful in providing complete and empirically rich data related to a phenomenon (Eisenhardt & Graebner, 2007). A case study also facilitates an examination of changes within an organization and its environment (Eisenhardt, 1989).

Our case firm is a company that provides ICTs services (mobile banking and remittances) to the BoP. To protect the identity of the company and its partners (Walsham, 2006), I use the pseudonym Alpha for the company and fictitious names for the respondents. Alpha started its operations in 2007 and developed a mobile-based solution to provide basic banking services to the unbanked in India. Alpha is a business correspondent (BC) and a mobile banking

technology provider. A BC is an intermediary between the banks and the customers and provides banking and financial services to the customers. As a BC, Alpha opens accounts with a zero balance called no frills accounts (NFAs) for major private and public sector banks such as ICICI and SBI and provides remittance services. In addition, it builds a low cost financial services infrastructure to increase the reach of the banks to the unbanked in both urban and rural areas. To achieve this, it converts retail shops into a network of agents and leverages existing, trusted, neighbourhood grocery stores (called *kiranas* in India), stationary and pharmacy shops as customer service points (CSPs) to deliver mobile banking services. Alpha's solution is not dependent on any particular network operator, or particular device and it works the same across all devices. In addition, the user interface consists of simply dialling a series of numbers.

In addition to its operations as a BC for SBI and ICICI bank, Alpha also works as mobile banking technology provider and through its technological platform offers cash management services such as cash collection and cash disbursal services to micro finance institutions (MFIs) such as Cashpor.

Data collection

The case firm was carefully chosen for theoretical reasons, as advised by Eisenhardt (1989). The selected firm fulfilled with the following criteria: (1) the firm's business model involved working with multiple partners from different industries, (2) the firm was acting primarily in the BoP market, and (3) the firm was relatively small and I could to observe how the value network played an important role in the firm's BM. The data collection for this study combined multiple sources of empirical material covering the entire history of the case firm

(see Table 3), from 2007 to 2014. The interviews with the employees of the firm took place in 2013 and 2014.

The main interviews were done with the company employees (the vice president and business development managers for various regions). The interviews with the key personnel focused on the initial BM and the growth of the firm to understand the revenue models and cost structure, explore the key partnerships, the source of value propositions, and key resources the firm had access to. Because the case firm is relatively small, interviews with key participants involved with Alpha represent the main source of information. However, to avoid bias from individual opinions (Huber & Power, 1985), ten other employees with a variety of positions in the firm's value network and at different organizational levels were interviewed. Furthermore, three employees who worked as independent consultants for the company were also interviewed.

Data Source	**Title of Interviewee**	**Number of Interviews**
Top level management	Vice president, international business	4 (2 in 2013 and 2 in 2014)
Other employees	Business development managers, area sales managers (north Delhi and west Delhi)	6 (in 2014)
Agent network	CSPs	10
Partners from banks and MFIs	Project manager and training manager, Cashpor, Varanasi Relationship manager and personal banker, SBI, Delhi	3 (Project manager in 2014) 4 (Training manager and senior training manager in 2014) 1 (Relationship manager in 2014) 1 (Personal banker, in 2014)
Independent consultants	Mobile money consultants	5 (in 2013 and 2014)
Customers	Users of the mobile money system by Alpha	10 (5 interviews in Delhi and 5 interviews in Varanasi in 2015)

Table 3: Details of the interviewees

Altogether, 44 interviews were done for this study, with each interview lasting from 30 to 45 mins (Table 3). The interviews were not recorded due to confidentiality requirements but I was allowed to take notes, which were transcribed immediately after the interview, with a maximum delay of 24 hours. In certain cases, the transcripts were sent back to the interviewees for review. In most cases, the interviewees (especially independent consultants and representatives from partner network) accepted the transcripts in the original form. However, in some cases, the interviewees gave minor comments related to some aspects that they were not comfortable mentioning in the public domain or related to some particular phrases.

In addition to the face-to-face interviews, telephone and e-mail communication was used to gather further information, and to clarify inconsistent issues. Furthermore, to avoid retrospective bias (Huber & Power, 1985; Miller, Cardinal, & Glick, 1997) various sources of secondary data (both qualitative and quantitative) were employed to triangulate and validate our findings (Miles & Huberman, 1994). Such sources of secondary data included the firm's website, press releases, industry reports, PowerPoint presentations, and publicly available video interviews (with other informants) (Silverman, 2011). Subsequently, the interview data were compared with these data sources. If there were inconsistencies, these were discussed with the persons interviewed. I also accessed artefacts such as demonstrations of the mobile money system during field visits to Delhi and Varanasi.

Data analysis

I conducted the analysis in line with the recommendations of Miles & Huberman (1994) and Ojala (2016). In line with Ojala (2016, Pg.458), the data analysis involved three simultaneous activities, *"(1) data reduction, (2) data display and (3) conclusion-drawing/verification"*. In

the first phase (data reduction), the interview transcripts were assimilated to arrive at a detailed description about the case firm and its evolution overtime. In this phase, our primary focus was on distilling what the different interviewee groups suggested about the BM and its dimensions. In addition, I also filtered and included relevant information from other data sources in the written document.

After summarizing the data, I divided the data according to the V4BM dimensions proposed by Al-Debei & Avison (2010) in the following categories presented in the next section (1) Value proposition, (2) Value network, (3) Value finance and (4) Value architecture. In this phase, a chronological timeline was also crafted to present the evolution of the company (2007-2014).

Ojala (2016, Pg 458) suggests that the objective of second phase (data display phase) is to filter data, and further arrange the data in table and figures under different heads. I followed this approach and prepared tables that included quotes from the interview data illustrating the important dimensions of the BM. The relevant quotes from the interviews are included in this paper. The figures created are based on the four dimensions identified by Al-Debei & Avison (2010). The four components identified can be seen as simplified versions of the nine business model pillars presented by Osterwalder, Pigneur, & Tucci (2005) (listed in appendix IV). Summarizing our data in the form of diagrams and graphs enables us to better visualize BMs (Osterwalder & Pigneur, 2013).

The final third phase of conclusion drawing and verification concentrated on identifying the aspects that were central for this paper and verifying the data sources with other secondary evidences. According to Ojala (2016, Pg 459), *"conclusion drawing involves stepping back to consider what the analysed data means and to assess its implications for the questions at*

hand". Verification is linked to conclusion drawing, and it requires reanalysing the data to cross-check and verify the conclusions and confirm the credibility of conclusions (Miles & Huberman, 1994). The primary data from the case firm were matched with the insights stemming from the literature review and the overall data was corroborated with the aim to extend the V4BM dimensions with a particular focus on BoP customers. In the next section, I present the key findings based on the data from the case firm.

3.4. Key findings

In what follows, I discuss the BM of Alpha across five dimensions, elucidate them and discuss why it is a relevant framework for analysing BMs for BoP.

3.4.1. Value proposition

The value proposition dimension involves descriptions about core services and products that the organization offers along with the value each product/service provides. The value proposition element includes a description of the product/services, the value elements and the targeted market segments (Al-Debei & Avison, 2010; Magretta, 2002).

Initially when Alpha started, their primary customers were those at the BoP. In 2007, Alpha started its operations by providing no frills accounts (NFAs) with a zero balance. However, this product did not prove to be profitable for the company. Therefore, in search for profitable product propositions the company launched a remittance product, named "Tatkal". The introduction of this product enabled Alpha to extend its customer base to include non-bank customers.

Thus, in urban areas Alpha's customers were both at the BoP and non-BoP. However, as Alpha functions as a technology provider to micro financial institutions (MFIs) such as Cashpor, based in Varanasi, the main customers in such areas were mainly those at the BoP (in particular women in the case of partnership with Cashpor).

In terms of the product offering, the Tatkal product and NFAs are mainly offered in urban areas such as Delhi enabling domestic migrants to remit money and conduct transactions over the mobile. In rural areas, Alpha offers the NFAs and cash collection facilities. From the customer's point of view, the key value proposition is convenient banking and an instant way to send money without queuing at the banks. There are a lot of migrant workers who need to send money back home to their families.

My Ma does not have to wait for the money now. She receives it immediately (Pappu, a migrant worker from Bihar who works as a rickshaw puller).

In addition, customers view this solution as a way to save money in a safe manner. In addition to the value embedded in immediate transfer of money to relatives, another value proposition emerged from the simple and easy way to do the transactions. As another migrant worker explains:

I can go anytime into the shop. Withdrawing cash and depositing money and all transactions are as easy as dialling a number on the mobile phone (RamLal, a migrant worker from Uttar Pradesh who works as a fruit seller).

The value proposition is not just restricted to customers but it also includes the value proposition for the value network partners. Thus, Alpha had the following value proposition for CSPs and banks:

Customer Service Points (CSPs): Alpha CSPs earn additional income through this business. Alpha, being a new player, lacks customer trust which is an important determinant for the adoption of mobile banking (Mallat, 2007). To overcome this, Alpha engaged with the local 'mom and pop' stores, such as kiranas, in the neighbourhood who act as CSPs. These stores have normally been doing business in the locality for at least 15 years and are trusted by customers as they do their day to day grocery shopping and other purchases from these stores.

My shop has been here for 20 years. We know all the people in the locality. They come to us daily for buying food items or other items. I tell them about this service and ask them to use it. I make additional income from this business (on being an Alpha CSP) (Parth, Alpha CSP, who owns a small grocery store).

In addition, by engaging with the CSPs, Alpha creates a network of human tellers where customers can perform banking transactions such as making deposits.

For banks: Alpha's services result in an increased customer base without the need to invest in traditional bricks-and-mortar branches. From the banks' perspective, the BM implies increased business in terms of customer base and expansion into different geographies:

We source accounts on behalf of the banks. We expand into geographies where establishing physical branches requires a huge investment and is not economically feasible (Alok, business development manager, Alpha).

Another respondent elaborates:

Banks get a lot of business from Alpha. They are not too keen on handling low ticket transactions. So they want to reduce the excessive footfall of these customers (Gaurav, Alpha CSP, owner of a stationary shop).

3.4.2. Value architecture

The value architecture dimension focuses on "*structural design of an organization, including its technological architecture and organizational infrastructure"* (Al-Debei & Avison, 2010, Pg.367). It comprises organizational assets, resources (tangible and intangible) and core competencies. In this context, Hedman & Kalling (2003) indicate that an organization needs multiple forms of resources such as human, physical, and technological to serve its customers. They also argue that such resources need to be organized and configured in a manner that imparts a competitive advantage to the firm.

One of the key resources that Alpha possesses is the technological system. In particular, its technological interface and system are both mobile based and computer based. Moreover, the user interface is device agnostic implying that the transactions can be carried out through any device. From the users' perspective the system is easy to use as it requires only number literacy and the mobile number serves as the financial identity of the customer. In addition, considering a CSP perspective, the system requires no additional investment in other equipment and infrastructure. Therefore, the technological system gives Alpha a competitive advantage as the interface provided by some of its competitors requires the stakeholders to purchase additional equipment or get an internet subscription. As Manavsi, VP international business mentioned:

Our competitive advantage is that our technological system and interface are easy to use and access (for the customers and CSPs).

Kishore, a florist in West Delhi commented:

I have my account with Alpha since 2008. It is easy to use, no hassle for composing messages. I only need to remember my mobile number. It is as simple as just making a call.

It was further noted by Nitin, an independent consultant:

The reason why Alpha has done better than its competitors is the technology advantage. Conducting a transaction over Alpha's platform is like making a missed call, the user only dials the number, but no one picks up the phone.

In addition to the technological system that is owned and controlled by Alpha, another crucial set of resources comes from the partner banks and the CSP network. The resource based view (RBV) assumes that the source of competitive advantage is based on the collected resources owned and controlled by the firm itself. Due to this assumption, RBV has received much criticism for under-emphasizing the costs associated with the development and acquisition of resources.

Lavie (2006) proposed an extended RBV (ERBV) and contends that a firm's source of competitive advantage arises from network resources and the capability of its partners. ERBV posits that*: "a dyadic network exists between a focal firm and a partner in the form of a strategic alliance or any other business relationship specified by contractual agreements"* (Son et al., 2014, Pg. 654; Dyer & Singh, 1998). These allies interact through network resources for their own business purposes. Network resources are defined as, *"external resources that are available through a firm's inter-organizational relationship with partners, provide strategic opportunities and affect firm behaviour and value*" (Lavie, 2006, Pg. 638). Network resources are different from those that are present within a firm's internal boundary

and they further provide organizations with strategic opportunities with less risk and cost (Son et al., 2014).

One such intangible resource that came from Alpha's partner network is the presence of a trusted brand. Alpha started its BC operations with SBI in January 2009. Alpha, being a start-up significantly lacked customers' trust but since SBI is a recognised and trusted brand of banking in India, Alpha was able to garner trust from people. In addition, many CSPs joined Alpha as they found a sense of pride in associating themselves with a trusted bank, i.e., SBI. As Rakesh, a CSP and owner of small stationary shop mentioned*:*

The logo of SBI in my shop gives me great pride. Many people from different areas come to my shop after seeing the logo of SBI in the shop.

Abhishek, Business Development Manager, explained:

Initially it was difficult to explain to customers the product we are offering. However, our association with a big trusted bank (SBI) gave us a lot of benefit in convincing customers of our offerings. Many customers prefer our product because they feel that their money is with SBI, so it's safe.

In another instance, Alpha partnered with CSPs who tend to be popular and trusted and thus managed to win the trust of people. For example, the customers interviewed signed up for savings services because they trusted the CSP.

RamLal, an auto rickshaw driver remarks:

I come here because I have full faith in Pritam bhai. His shop has been here for 10 years. I do not know who Alpha is. I only know Pritam bhai and trust him with my money.

3.4.3. Value network

The value network dimension depicts, *"the external arrangements which revolve around the communication and collaboration an organization has with the stakeholders and is presented as a multi-party stakeholder network"* (Al-Debei & Avison, 2010, Pg. 367). The stakeholder network includes a large array of actors such as suppliers, customers, marketers and competitors (Bouwman, 2002; Giaglis, Kallio, Tinnilä, & Tseng, 2006; Hedman & Kalling, 2003). Thus, the value network depicts the inter-organization perspective (Al-Debei et al., 2014).

This is crucial since delivering ICTs requires diversified resources (both tangible and intangible) such as a trustworthy image, distribution network and technical expertise that rarely exist within one organization. Indeed, Alpha entered the mobile banking industry with almost zero experience. Hence, it was rational to develop the ICT system with other key experienced banks and telecoms such as SBI, ICICI, and Airtel in the Indian market. In addition, Alpha has further extended the geographical reach by creating new partnerships with other private sector banks and MFIs. Although Alpha has expanded its reach to include MFIs, CSPs, and banks, it does not have complete governance in terms of power and control over its value network actors. Governance in the BM literature is defined as, "*who within the value network, has control and power over what kind of objects and resources, e.g. relationships, channels, and transactions"* (Al-Debei, Al-Lozi, & Fitzgerald, 2013, Pg. 353). For example, the bank accounts are held with the SBI, the customer relationships are mainly attributed to the CSPs and the distribution channel is owned by Alpha.

The value network dimension is even more important while delivering ICTs to the BoP as providers and users might be "separated" from each other due to physical distance, lack of

financial ability, and information asymmetry (Tarafdar, Anekal, & Singh, 2013). Furthermore, many BoP markets are plagued by the presence of "institutional voids", a situation where institutions that support markets are either weak or absent altogether (Mair & Marti, 2009).

To counter such voids, many organizations make use of intermediaries. Thus, producers of ICTs are indirectly connected to customers through supply chains of independent intermediaries (Foster & Heeks, 2014). In addition, to serve BoP communities a richer network of intermediaries should be developed, a network that must introduce a plethora of minor adaptive innovations to ensure ICT access, adoption, and use (Foster & Heeks, 2013).

Although it is known that such intermediaries are involved in the value network, we have limited knowledge of the characteristics and nature of such intermediaries. In particular, in the BoP markets, many intermediaries are based in informal local markets and are often exploitative (Prahalad & Hammond, 2002).

However, my study demonstrates that to deliver ICTs to the BoP in an effective manner, such intermediaries should not be exploitative intermediaries but should rather be innofusion intermediaries (Foster & Heeks, 2013). Innofusion intermediaries are those that link distant supply and demand, stand in the value chain between producer and customer, and are innovative in numerous small ways to ensure diffusion and use of technology (Foster & Heeks, 2014). Thus, the BMs for BoP entail an active participation of innofusion intermediaries who support the diffusion and adoption of ICTs (Foster & Heeks, 2013). These intermediaries develop local innovations in practices and processes and enable the diffusion of ICTs. The role of innofusion intermediaries is enacted by the CSPs. For example, the CSPs adopt flexible opening hours to enable the users to transact when convenient to

them. In addition, they also give paper receipts to the customers confirming the transaction. Although, this practice has no legal status, CSPs use it when necessary. Sachin, an independent consultant elaborates further:

The rules laid down by Alpha clearly specify that the paper receipt is not valid because some CSPs hand over receipts which have been completed incorrectly, for example, they may not specify the amount charged correctly.

However, this informal practice is widely adopted by all the CSPs interviewed, As Shyam, a CSP who owns a grocery store, mentions:

Customers only trust the deposit slip. What can we CSPs do? We do this only to maintain the trust of the customer in Alpha services.

They also record and maintain a repository of daily transactions to check for any inconsistencies related to the transactions. Again as in the previous case related to paper receipts, all the interviewees mentioned that they adhere to such a record keeping exercise. As Prakash, a CSP who owns a mobile phone store, comments:

We maintain our own register where we record how many transfers/withdrawals take place, the name of the customer, his mobile number and the amount transacted. Sometimes, we do the transaction here but the customer's relative tells he did not get the money. To ensure such inconsistencies do not occur, we maintain records on a daily basis.

Our investigation of the case firm's value network reveals that while considering BMs to deliver ICTs to the BoP, it is necessary to include innofusion intermediaries in the value network in addition to other partners such as designers and providers of ICTs.

3.4.4. Value finance

The value finance dimension represents the cost structure and revenue streams for the organization. From our case firm I observed the following offerings:

Margins from No Frills Accounts (NFAs): Alpha offers a no-frills SBI Mini Savings Bank Account. Although there are no opening fees or minimum balance requirements, CSPs invite customers to open accounts with 100 rupees (US$1.50) (Chemonics, 2010).

Once the account is registered, users can perform all financial transactions such as deposits, withdrawals, remittances, and bill payments. The NFAs are offered as part of the financial inclusion program by the Government of India. This was not viewed as a revenue making product from the point of view of banks. However, for Alpha it was one of their core products until 2011. The 2006 Reserve Bank of India directives did not permit the BCs to charge clients a fee for any transaction at a CSP. However, Alpha received the remuneration from the partner bank. For example, at each quarter, Alpha gets 10 rupees from SBI for each account opened, 0.5 percent of the value of each transaction, and 40 rupees for each active account (Laureti & Matthews, 2009). But, costs such as marketing, the recruitment, selection, and training of agents is borne by Alpha. SBI paid Alpha 10 rupees for every account sourced, whereas Alpha paid 30 rupees to its CSP. This higher commission by Alpha was to incentivize the CSPs to promote the product to clients.

"Tatkal" Remittances: In the second half of 2011 Alpha promoted a revised offering that provided an efficient way to remit money into the account of a bank anywhere in India. Due

to the Tatkal product, Alpha doubled its revenues and operating losses were reduced to 16% of revenue by February 2012 (Chen, 2012).

The partner bank sets the prices of the services offered. For example, the service offered in partnership with SBI charges the client a fee of 2.5% for lower values (about US$20), and 1-2% for higher ranges between US$100-200. This fee is shared between Alpha and SBI. The banks receive 20-30% of the price charged to the customer (this arrangement in sharing of margins is decided by the partner bank). Alpha in turn receives 70-80% of commissions, but then passes on 45-55% of what they receive to the CSPs (this proportion is instead decided by Alpha) (Mas & McCaffrey, 2015).

Processing Mobile-Based Transactions: In addition to the above-mentioned revenue streams, Alpha acts as the technology provider for other BCs due to its mobile-based interface. For example, in rural areas, Cashpor, an MFI and another BC uses the platform of Alpha to conduct mobile based transactions. Alpha earns an income based on the number and amount of transactions conducted over its platform.

In Alpha's BM, not all aspects of value finance are decided by the lead actor Alpha. For example, although the partner banks decide the fees to be charged to the clients and the proportion of margins to be paid to Alpha, the margins paid to the CSPs are decided by Alpha. These are formalized arrangements among Alpha, the partner banks and the CSPs. However, in many cases informal financial arrangements appear that are not officially documented. For example, CSPs sometimes overcharge the customers for the transactions. Such financial arrangements are out of the sight of Alpha and the banks. None of the CSPs I interviewed mentioned engaging in this practice. However, the CSPs did mention that they

felt they were underpaid for the amount of tasks they undertake. For example, Vijay, a CSP who owns a mobile recharge shop in North Delhi but did only a few transactions mentioned:

It is very difficult to survive solely on this business. All the risks are borne by the CSP such as risk of fake notes or wrong transactions. But still we are not compensated adequately.

It was observed that overcharging by agents is widespread, with many respondents in Delhi admitting that many CSPs charge a "service fee", i.e. charging extra money from clients. In addition, some CSPs were encouraging certain products. For instance, it was common for CSPs to give priority to remittance services as opposed to NFAs since remittance services pay them higher margins.

3.4.5. Value co-creation

Co-creation with partners, institutions and customers is becoming increasingly pervasive in the BoP communities. Co-creation with local actors is a vital source of knowledge and understanding of the local needs and practices (Ray & Ray, 2010). In addition, co-creation with reliable local partners can be crucial for companies such as start-ups to build legitimacy and trust at BoP markets (Rivera-Santos & Rufín, 2010).

The results from our case study suggest that BMs which entail value co-creation are crucial to orchestrate business ecosystems such as ICT ecosystems, wherein there exist interdependencies among the partners. The resources required to orchestrate the ecosystems are not owned by a single organization, rather they are controlled by different organizations. Furthermore, BMs based on value co-creation are useful to organizations especially start-ups that are resource scarce (presumably because of lack of sales force and financial resources

required to expand the business) (Sarker et al., 2012). Based on the study, I highlight below the ways in which value co-creation occurs (Sarker et al., 2012), albeit in BoP communities.

Co-creating value through bartering (Exchange): This way of value co-creation could be viewed as one wherein the two partners in an alliance co-develop value by providing resources that the other partner needs to serve the customers effectively (Sarker et al., 2012). Our case firm engages in this value exchange as it provides the technology platform through which bank accounts can be accessed and financial transactions conducted. Alpha also sources accounts on behalf of SBI and provides the mobile banking services to the BoP. SBI in turn provides Alpha access to its systems and knowledge around the banking industry. This sort of barter was particularly useful while developing the Tatkal product (remittances). As Manavsi, VP, international business, explained this to us:

Before rolling out the Tatkal product, we sent out a process document that described 'remittance to core' to the SBI team. They liked the idea but suggested a lot of changes and suggestions that we have implemented over time and this has made the product successful.

In addition to this, Abhishek, the business development manager argued:

What we achieved for banks through this product was the decongestion of hundreds of bank branches. Migrants who had to previously forfeit their day's work to travel to the bank, wait for hours in a queue (most banks work only for a few hours of the day, normally from 10 am to 3 pm), now had a viable option – their next door grocer (CSP).

In another alliance, the MFI Cashpor accesses the technological platform of Alpha and in turn Alpha expands its operations to rural areas without deploying sales personnel and a network

of bricks and mortar branches. On the partnership with Alpha, Dhananjay, the project manager suggests:

It is a win-win situation for both Alpha and Cashpor. Our clients use their system for mobile banking. They also have a significant presence here (Varanasi) now with almost zero cost.

Co-creating value through layering (Addition): In this mode the value is co-created when a partner provides additional value to the one provided by the other. For example, the CSPs provide training to the customers on how to conduct transactions over the mobile. In addition, they adopt flexible working hours so that customers can transact at their convenience. All the CSPs interviewed admitted to be engaging in what I call, "CSP assisted banking". As Shyam, one of the CSPs interviewed mentioned:

They are not educated, coming from village to work here. If wrong transaction happens, their money is lost. In the case, where a customer is not confident of doing the transaction, I complete the transaction through his mobile phone.

Another CSP, Prakash, argued that:

The Alpha system is good but if we are not available till late it is of little value to the client. I open my shop from 9 am till 10 pm so a customer can come to send money anytime. Sometimes the system is offline, but still I serve the client, note the transaction in the diary and do it later when the system is available.

Thus, in addition to the technological platform that Alpha provides, its CSPs enhance the overall value by being the local advisors.

Co-creating value through amalgamation (Synergistic integration): In this mode, the firm and its partners work together in a mutually reinforcing way, while compromising some of their own autonomy (Sarker at al., 2012). For example, Alpha's CSPs distribute paper receipts for the financial transactions in cases where a confirmatory message is not received by the client. Despite the provision of a message receipt functionality by Alpha and their dissuasion of the use of paper receipts, users and CSPs proactively introduced the practice of distributing and accepting paper receipts. Thus, the paper receipt functionality is well integrated into the mobile money system (through initiatives of CSPs and customers).

As Parth, a CSP puts it:

Customer trust only this receipt. I am not the only one doing this. In this area all CSPs give paper receipts. Whether Alpha likes it or not, I will continue to do this.

Gaurav, another CSP stated:

If they need business, they do need to compromise. Earlier they used to tell us to stop this. But now no one cares. Customers demand it. They cannot risk their business by disapproving.

The practice of giving paper receipts was implemented as it enhanced CSP availability (they could accept transaction requests from customers during the periods when the system went offline for two hours in the evenings) and increased operational efficiency (CSPs could process transactions in batches). Thus, some CSPs collected cash from customers, provided a paper receipt but postponed the transaction for later when the system was available.

Co-creating value through governance: This form of co-creation (Grover & Kohli, 2012) focuses on value co-creation through social and informal controls resulting in lower transactions costs. According to Kohli & Grover (2008) the co-creation of value can be

achieved in two ways, information technology (IT)-based, and non-IT-based. In IT-based value co-creation, IT is used as a channel for creating value, while in the non-IT-based value co-creation partners collaborate in creating value with less attention to IT (Solli-Sæther & Flak, 2014). In addition to the former case, where the IT system was a useful tool to co-create value for other partners, my study also lends support to the latter case where the partners collaborate to create business value. The CSPs in our case study, engage in such forms of co-creation through increased monitoring and regulation. The CSPs for example, lower down the transaction costs for Alpha by enforcing regulatory controls and monitoring of customers, thereby limiting opportunistic behaviour (on the part of customers who might misuse the system to transfer black money).

I uncovered a few such governance mechanisms. The first relates to the involuntary and informal conversations that occur between the CSPs and the customer. For example, in our case the CSPs undertake to know their customer and carry out anti-money laundering checks with the customers so as to avoid indulgence in fraudulent activities by omission.

As Vijay, a CSP explains:

If a client comes here for the first time, I spend a couple of minutes to see if he is genuine or not. I ask questions like the purpose of sending money, where he works etc.

The CSPs sell a myriad of products and some also sell goods at credit to the customers and therefore have quite an understanding of the 'credit' history of the residents. The lack of official records pertaining to the customer is often replaced by the insights that CSPs have about the customer.

A second form of governance control was put in place by Alpha and its bank partners. In addition to the social and informal controls put in place by CSPs, legal contracts and explicit rules are also underlined by the partner banks to minimize opportunistic behaviour. For instance, each partner bank has put a ceiling on the number of transactions a client can make in a single day. Thus, there are limits on the amount of money that can be transacted in a month and in a single day and on the number of transactions (International Finance Corporation, 2013; Lahiri & Mehta, 2011). Such formal rules control and regulate the 'opportunistic' behaviour of some customers (for example, transferring black money). In addition to minimizing the opportunistic behaviour on the part of clients, Alpha also enforces legal contracts while selecting and recruiting its CSPs. CSPs could exhibit opportunistic behaviour by selling the services of more than one mobile money provider and thus encourage the ones where the margins are highest. For example, in a particular geography a CSP associated with Alpha can only sell the services of Alpha and not its competitors.

3.5. Discussion

Many ICT projects directed at BoP have a short lifespan, being donor-driven pilots (De Carvalho, Feinberg, Klarsfeld, Lepicard, & Posthumus, 2012). Such projects often lack an economically viable, long-term value proposition and are based on non-sustainable BMs. Thus, there is a pressing need to create and explore new BMs that are sustainable and impactful (De Carvalho et al., 2012; Thapa & Saebo, 2011). In addition, it is widely accepted that a different set of BMs are required in order to serve the BoP markets (Anderson & Kupp, 2008; Foster & Heeks, 2013; Ramani et al., 2012). Thus, organizations that wish to serve the BoP might have to adopt new BMs as they might lack the capabilities and skills to engage with BoP clients (London & Hart, 2004). For example, firms that lack certain skills, resources

and knowledge indispensable to serve BoP segments might look for partners who can bring in those resources and knowledge.

In spite of the agreements about the differing dimensions in the BMs, there is little discussion on the components of such BMs. My study explores the five key dimensions of such BMs that includes value co-creation among the firm, its partners and its customers. The study underlines that the value proposition to the final user is appropriated by the joint effort of the partners and emanates through the co-created value. The co-creation perspective (Prahalad & Ramaswamy, 2000, 2004) is based on the principle that companies can harness their customers' competences by engaging with them and moving beyond the buyer-seller relationship. However, such a perspective needs to move beyond the client perspective to examine the ways in which the firm and its partners can co-create value for each other as well as the firm's clients. It is here where my study places its contribution. This study demonstrates the ways in which co-creation occurs among the firm and its partners. In addition to the previous studies that have mainly focussed on IT-based co-creation of value (Hadaya & Cassivi, 2012; Sarker et al., 2012), I provide evidence for non IT-based value co-creation.

The concept of co-creation has a central role in BoP literature. In BoP contexts, co-creation among BoP customers, partners, non-profit organizations and other actors has been widely acknowledged for shaping BMs. Despite this increased emphasis on value co-creation in BoP communities, there is very little research on how value co-creation at BoP markets unfolds in practice. For example, issues such as the ways in which value co-creation occurs and the characteristics of co-creation partners have found limited discussion in the BoP literature (Nahi, 2012). My study also contributes along the last dimension, i.e., the characteristics of the actors in the value network. My study emphasizes that the value network needs to be

envisaged as an innofusion network (CSPs as innofusion intermediaries) in designing BMs to deliver ICTs to the BoP.

In addition to the value co-creation and innofusion network perspective, this research contends that not all BM content is under the control of the lead firm. My study highlights that certain aspects of the value finance dimension such as additional charges levied to the client were not even known to the lead firm and were decided by the CSPs.

This study presents findings that are somewhat different than those presented by Foster & Heeks (2013) wherein they argue that BMs for the BoP need to move beyond the co-creation literature. Although I agree that innofusion network needs to be put in place for delivering ICTs to the BoP, I also emphasize that value co-creation among partners and customers is crucial in cases such as ours where the lead firm was a start-up and thus lacked significant resources such as banking expertise, distribution network and customer knowledge. Indeed, BMs based on co-creation gain increased importance in cases where organizations are resource-scarce (Sarker et al., 2012).

Lastly, this study argues for business models that give attention to social aspects of the BoP communities.

3.6. Conclusion and future studies

This study presents the V5BM dimensions (the five value dimensions of business models) that are relevant for delivering ICTs to the BoP. In addition to introducing the value co-creation dimension, our work also highlights the ways in which value co-creations occurs among the firm and its stakeholders in the BoP context. Although I have highlighted our contributions, a single-case study method is context-specific and additional studies are

desirable. Further, I could not interview the representatives from the regulatory body, the RBI, although I incorporated industry reports and RBI briefings to ensure the robustness of our findings.

Lastly, this is just one case of a company from a market (India) that has not seen huge success in terms of mass adoption of mobile money services. Even though India lags behind countries such as Kenya in terms of the population using mobile money services, Alpha has a good presence across major cities in India, has served about 8.5 million customers, adds 200,000 customers a month and processed transactions worth US$2.7 billion (Manavsi, VP, international business). Future studies, could also examine the V5BM dimensions in other BoP markets such as Kenya to uncover other ways of value co-creation. In addition, more studies could be undertaken to undertaken to evaluate whether the V5BM dimensions hold true for developed markets as well.

4. Paper III

Inclusive innovation through mobile technologies? Insights from micro financial institutions[5].

Abstract

Increased interest in lower income customer groups in developing markets has led to the conceptualization of inclusive innovation: the means by which new goods and services are developed for marginalized groups such as those living on lowest incomes. Mobile technologies may be used to put inclusive innovation systems into practice with a specific focus on the marginalized poor. Micro financial institutions are a key stakeholder that could operationalise inclusive innovation systems. However, there is little evidence, apart from the focus on micro credit, about how such institutions leverage mobile technologies to foster inclusive innovation. Building upon the case of a mobile banking service provided by a micro financial institution based in India to rural women, this study provides lessons on the factors that are critical in facilitating inclusive innovation. The study shows the importance of social mission, accessible and affordable products to ensure a participatory innovation process which is based on local needs and rooted in the local context of rural India. Critical to this is the need to infuse several innovations in products, services and processes by including these groups in the design and development of services. Furthermore, informal institutions embedded in norms and values, infomediaries and intermediaries are crucial to examine the

[5] An abridged version of this paper, titled : Women and ICT enabled well-being: Inclusive innovation by micro financial institutions in India, was presented at the 13th International Conference on Social Implications of Computers in Developing Countries at Sri Lanka in 2014. Thus, much of the material for this paper comes from the conference paper and can be accessed at http://www.ifipwg94.org/ifip-wg94-conference-2015

decisions of rural poor. Lastly, the study also highlights the positive impact of inclusive innovation through the change in status of assets owned by rural women.

Keywords: Mobile technologies, Micro financial institutions, Women, Inclusive innovation, Rural India

4.1. Mobile technologies and inclusive innovation

Mobile technologies represent an important innovation that increasingly impact the lives of the poor in developing countries (Duncombe, 2012). Most of the countries in the developing have skipped broadband fixed-line infrastructure and leapfrogged directly into mobile technology (Duncombe & Boateng, 2009). Currently mobile telephony is the leading mode of communication in the developing world. In particular, the mobile phone revolution is identified as a new wave of Information and Communications Technologies (ICTs) which comprises *"new technologies, new approaches to innovation, new intellectual integration, and above all, a new view of the world's poor"* (Heeks, 2008).

Mobile technologies and in particular, mobile phones are considered as particularly important for development. First, beyond basic connectivity, mobile technologies offer benefits such as mobility to owners (Donner, 2006). Second, mobile technologies are becoming increasingly affordable to the low-income users and can be leveraged to ensure greater participation of the marginalized in the development process (for example better health and education) (Rashid & Elder, 2009).

More recently, mobile technologies have emerged as an important channel to enable inclusive innovation. Inclusive innovation approaches are a response to conventional innovation system approaches which do not fully address the inclusivity of the poor in the different stages of innovation development (for example, the involvement of poor in design and development) and in the output of innovation (services have beneficial impact on the lives of the poor)(Swaans et al., 2014). Micro financial institutions (MFIs) are considered as a potential stakeholder to reach out to the marginalized through microcredit (a successful inclusive innovation).

MFIs are now leveraging mobile technologies to provide other forms of financial services such as mobile banking (Hanouch & Parker Rotman, 2013). MFIs consider mobile enabled banking as a good opportunity to target new customer segments and expand to other geographies. Mobile technologies can expand the reach of MFIs that struggle with the high costs associated with providing services to rural and poor customers (Sadhan, 2014). However, there is little evidence of an MFI playing a driving role in the adoption of mobile banking. This is even more surprising considering the number of opportunities mobile technologies provide for enabling inclusive innovation (in the form of mobile banking). A recent surge in mobile technologies has paved the way for innovations in products and processes (Duncombe & Heeks, 2002). Despite the promise of mobile technologies, there is little evidence of how MFIs (an important stakeholder) are utilizing them to enable inclusive innovation. Although there are interesting discussions about how MFIs have succeeded in providing microcredit to the poor, few studies have explored in detail the usage of mobile technologies to provide banking services such as savings accounts.

The research question is: *How can MFIs leverage mobile technologies to foster inclusive innovation?* I address this research question by investigating the implementation of a mobile banking product by a MFI in a rural area of India. In particular, I study the provision of mobile banking services to women in this context.

To address our research question, I employ the inclusive innovation framework as it argues for an active involvement of the marginalized in the design, development and implementation of ICTs (in our case mobile technologies). In addition, it also entails active participation of innofusion intermediaries who support the diffusion and adoption of ICTs in local communities (Foster & Heeks, 2013b). My study demonstrates how one form of inclusive innovation (micro credit) forms a basis for other forms of inclusive innovation such as mobile

banking. In the next section, I introduce and discuss the framework of inclusive innovation. Section 4.3 presents the case and the research setting. Case findings are elaborated in section 4.4. Section 4.5 discusses the implications of our findings for research and practice followed by the conclusion.

4.2. Inclusive innovation and women

Inclusive innovation framework

Inclusive innovation is an emerging form of innovation in developing countries and is the means by which new goods and services are developed for and by those living on lowest incomes. Inclusive innovation involves the participation of the marginalized in identifying their development priorities and in providing incentives for various actors to address their needs. Marginalized groups such as women, young people, the disabled and ethnic minorities have been the target of concern for inclusive innovation (Codagnone et al., 2009).

Inclusive innovation in a broad sense refers to the inclusion within some aspect of innovation of groups who are currently marginalised or disenfranchised. These groups are the ones that live on lowest incomes (for example, less than US$1 or US$2 per day), but women, youth, the disabled and ethnic minorities are also included (Codagnone et al., 2009). Furthermore, inclusive innovation conceives development as socio-economic inclusion. Inclusive innovation is central to development strategies and represents a new approach to understand development (Foster & Heeks, 2013a). As, Foster & Heeks (2013b) put it: *"Conventional views of innovation regard development as a generalised economic growth. By contrast, inclusive innovation conceives development in terms of active inclusion of those who are excluded."*

Unlike the Systems of Innovation (SoI) framework (Edquist, 2005) which has been used to analyze innovation policy in developing countries, inclusive innovation explicitly conceives development in terms of the active inclusion of those who are excluded from mainstream development. Inclusive innovation tends to focus on the micro level and local needs. In particular, it includes informal relations, incremental learning and intermediaries into the core structure of innovation, actors, learning, relations and institutions (Foster & Heeks, 2013b).

Foster & Heeks (2013a) examine the role of policy in such inclusive innovation systems by analyzing the Kenyan mobile technology market. Their analysis suggests that inclusive innovation in ICTs is based on four key domains: the product, its retailing and support, the micro-enterprises that provide the services, and the wider institutional context. In addition, inclusive innovation in ICTs is built upon interactions among certain key factors such as adaptive innovation, competition, the role of intermediaries and regulatory interventions.

The role of intermediaries is crucial in an inclusive innovation system (Foster & Heeks, 2013; Foster & Heeks, 2013b). The key actors in an inclusive innovation system are the demand-side micro-enterprises embedded in marginalized communities. These intermediaries play a crucial role in all the four domains (the product, its retailing and support, the micro-enterprises that provide the services and the wider institutional context). The producers, suppliers and customers also play significant roles. Exploring their roles can generate useful insights into the strategies adopted by them to support inclusive innovation systems (Foster & Heeks, 2013b). Furthermore, recent research on inclusive innovation in low income markets has shown that interactions between local innovation intermediaries and company-led institutional structures are also important in supporting inclusive innovation (Foster & Heeks, 2014).

Inclusive innovation proves an appropriate framework to investigate the impact of mobile phones on the social development of those who are marginalized because it involves their greater participation, especially with regard to the four key issues seen in Table 4 (Cozzens & Sutz, 2014; Foster & Heeks, 2013b). Any form of innovation should fulfill at least one of the criteria (in Table 4) to be considered as inclusive innovation. For example, an innovation is inclusive if the intention of that innovation is to address the needs or problems of the excluded group (criteria 1: inclusivity of precursors). Inclusivity of processes implies that an innovation is inclusive if the marginalized are involved in the development of the innovation.

Inclusivity issues	**Description**
Inclusivity of precursor	Problems addressed are of relevance to marginalized
Inclusivity of process	Members from marginalized communities play a role in design and development of services
Inclusivity of adoption	Customers have capabilities to absorb innovation
Inclusivity of impact	Services have beneficial impact on the lives of poor

Table 4: Key inclusivity issues

ICTs for rural women

Dominant attention in inclusive innovation has been on “the poor”, those on lowest incomes (US$1, US$1.25, US$2, US$2.50 per day). This focus only on the poor is not encouraging given the evidence that role of mobile technologies in enabling innovation for women is contested due to the social and cultural constraints in developing countries. The enthusiasm for mobile technology is tempered by concerns that women may have limited access and literacy with mobile devices, creating a gap in their access to services that are delivered through mobile. This study focuses the attention on rural women and how mobile technologies are enabling inclusive innovation in rural areas.

Our focus on women in rural areas as an exemplar for marginalized communities is not accidental, it is sparked by the discouraging evidence related to the usage and adoption of ICTs and in particular mobile devices by women (Potnis, 2016). The existing research on the gender disparities has highlighted that economic reasons prevent women from owning mobile phones in developing nations. For instance, an extensive survey done in 12 Latin American and 13 African countries between 2005 and 2008 found that women's adverse conditions related to employment and income are mainly responsible for the limited access to and use of ICTs in developing nations (Hilbert, 2011). The cost of maintaining mobile phones, women's limited economic progress, and lack of access to income sources are some of the barriers that lead to limited or non-usage of mobile phones (Potnis, 2015).

Despite the agreement on the gender inequalities related to ownership and usage of mobile phones, little is known about the real situation of women and mobile phones, particularly in rural areas of developing countries; in particular, insufficient attention has been paid to the actual perspectives and experiences of women (Geldof, 2011). Given the focus that inclusive innovation puts on inclusion of socially excluded, it is an appropriate lens to explore the socio-economic inclusion of rural women. MFIs have a long standing relationships with rural women because of their operations in the microcredit sector. Research on MFIs has suggested that microcredit programs have a positive impact on women in terms of economic and social well-being (Kato & Kratzer, 2013). Despite the potential of mobile technologies to enable inclusive innovation and the experience of MFIs in dealing with rural women, we have little evidence of MFIs using mobile technologies to enable inclusive innovation. I thus investigate how MFIs can leverage mobile technologies to facilitate inclusive innovation in communities of rural women. In the next section, I present the research methodology and setting adopted for this research.

4.3. Research methodology and context

Research setting

India is an appropriate research setting to address mobile banking initiatives led by MFIs, and particularly for women.

1. The primary reason for choosing India is its position as the largest market in the microfinance industry with more than 1000 MFIs operating with 49.4 million active borrowers and thus, making it an extremely competitive market (MixMarket, 2015).
2. India is a nation with a population of over 1.3 billion where the coverage of mobile technologies has rapidly grown, and the number of mobile phone subscriptions have increased by approximately 500% since (Potnis, 2016). However, the conditions for owning a mobile phone are more in favour of women than of men. For instance, in 2011, women owned less than 30% of the overall mobile phone subscriptions in India (Potnis, 2016). In addition, men have several advantages over women in terms of accessing ICTs due to the male-dominated characteristic of Indian society (Shirazi, 2012; Venkatesh, 2000).
3. Although India has progressed technologically, it ranks poorly on factors such as human development index, gender equality and caste divide (India RealTime, 2013). The status of women in terms of employment and education is dismally satisfactory (Mathur, 2014). A study conducted with poor women in slum areas highlights a number of barriers they need to deal with in using mobile phones. For instance, Potnis (2016) contends that men often have a habit of discouraging women from owning and using a mobile phone. In addition, in rural India, the fear of unsolicited, offensive

calls from unidentified males discourage women from owning a mobile phone (Potnis, 2011).

4. Despite the conservative norms, male-dominated societies and various limitations imposed by the male members, in 2011, roughly 225 million women owned and used mobile phones in India (Potnis, 2016). A 2012 study conducted by the GSMA Development Fund and the Cherie Blair Foundation highlights that 28% of Indian women own a mobile phone. An additional 20% of women access the mobile phones through family members or friends (Arivanandan, 2013). Moreover, mobile phones are low cost and relatively easy to afford; prices are as low as US$15–20 and call rates stand at 1 cent per minute (Potnis, 2016).
5. Lastly, India has demonstrated its willingness towards inclusive growth and placed inclusive innovation as a core policy element for the decade of the 2010s, including a US$80 million India Inclusive Innovation fund (Heeks et al., 2013).

The study focuses, in particular on mobile banking, a new channel aiming to reach about 2.5 billion unbanked poor in developing countries (Mohan & Potnis, 2015). This research examines the delivery of mobile banking services to poor women by MFIs in the villages around Varanasi, India. Microfinance is primarily based on providing microcredit, the provision of small unsecured loans (with no collateral) to the poor so that they can initiate micro businesses to generate income, invest in asset-building and develop their livelihoods (Mohan, Potnis, & Alter, 2013).

The case firm Cashpor works as a business correspondent (BC) for the ICP Bank. Cashpor received “2015 Microfinance Institution of the Year Award” in Asia-pacific region from Whole Planet Foundation (Cashpor, 2014). Besides this, Cashpor is the first MFI to use mobile technology and ICT-based innovations to carry out its core microfinance operations

and achieved break-even in the year 2007 (Skoch, 2015a). It also received the award by the Skoch foundation under the category financial inclusion in 2015 (Skoch, 2015b).

In 2006, the government of India launched its program to promote branchless banking and financial inclusion through the BC model. BCs provide banking services such as opening bank accounts, accepting deposits, and offering withdrawal facilities. MFIs in India, however, are not allowed to directly mobilize deposits. Cashpor, therefore, saw the BC model as a channel to offer savings services to its customers. Cashpor leverages its existing human resources, mobile technologies and branch infrastructure to offer Apna savings accounts (Apna means ‘our’ in English).

Cashpor was keen to expand its offerings to include savings services to its existing loan customers. In addition to making customers' lives more financially stable, offering savings services made good business sense for Cashpor as it helped ensure customer stickiness or retention and therefore lower turnover of customers. Cashpor is a not-for-profit organization established in 2002 as a group lending institution, lending small amounts of money to poor women in the states of Uttar Pradesh and Bihar. The sums ranged from 2,000 rupees to 8,000 rupees (about US$33 and US$133 respectively). In 2011, under a partnership with Alpha and ICP Bank, it started to offer mobile-based banking services. Cashpor has helped over 1,57,968 disadvantaged women (47% of whom belong to the ‘scheduled’ castes and 34% to other ‘backward’ classes), between the ages of 20 and 60, to open a savings account through their mobile phones (Majumdar, 2014).

India has the fourth-largest banking network in the world. Despite this promising statistic, 94 percent of India’s 600,000 villages do not have a single bank branch; leaving 120 million households unbanked (CRISIL, 2009). The lack of access to basic financial services is linked

with low income levels and the inability to save. In India, 42 percent of the total population, or 490 million people, live below the poverty level of US$1.25 per day (UNDP, 2009). Banks find it non-profitable to serve the unbanked poor due to the high cost of processing a large number of small value transaction and the tiny profit margins from small loans or saving accounts (Mohan et al., 2013). For example, the cost of establishing a bank network in remote locations in rural areas is 80 percent higher than similar costs in more accessible regions (IFAD, 2008). Other unfavorable factors include lack of collateral for loans and difficulty of completing the paperwork due to low literacy levels (Mohan & Potnis, 2015).

Data collection and analysis

Our case study research (Yin, 2008; Walsham, 1995) draws on 55 semi-structured interviews undertaken in 2013 and 2015 as part of research into the mobile money sector. The informal and systematic mode of inquiry in qualitative research allows for a deeper involvement of the researcher in the relationships between the company and the poor rural females. Delivering mobile money services represent a complex and dynamic phenomenon with many actors, organizations and institutions involved and influencing the provision of services. In this context, the case study method provides the opportunity to produce a rich description of the phenomenon and its underlying mechanisms (Eisenhardt & Graebner, 2007). Furthermore, it allows for inspection of the activities and experiences of the subjects by exploring the contextual features in which the subject and their actions are embedded.

The details of the interviewees are mentioned in Table 5. Out of the 42 interviews, 31 were carried face to face. The remaining 11 interviews were follow up interviews conducted over skype and phone. The interviews with the women lasted for about 20-30 minutes. The interviews with other respondents lasted for about 40-50 minutes. the interviews were guided

by open ended questions. The interviews included questions on each interviewee's history with the company and a job description, the communication with customers and other partners, the challenges faced in delivering the mobile money services and the mechanisms used to overcome the challenges. In the case of women, questions were related to the activities they undertake and other personal information. Interviews also focused on pros and cons of using mobile banking services, the activities they do with mobile money services.

Respondents Organization	**Interviews (Face to face)**	**Interviews (Skype/Phone)**	**Total**
Cashpor: Business Development Manager, Training Manager, Senior Training Manager, Project Manager, Branch Managers, loan officers	10	5	15
Alpha: VP, International Business, Business Development Managers, Business Analysts.	6	4	10
Women (in rural areas)	10	0	10
Independent Consultants	3	2	5
Banks	2	0	2
Total	31	11	42

Table 5: Interviewee details

The interviews with women, officials at Cashpor and the bank were conducted in Hindi. While the interviews with Alpha, the representatives from technology partners were conducted in English. I also attended two weekly meetings and observed the interactions between the women and loan officers. I conducted the interviews with the women after the weekly meetings. This allowed me to clarify or seek more information about certain actions observed during the meetings.

Data gathering also included extensive document analysis, particularly that relating to the strategies of lead firms in the mobile money services.

As research inquiries are informed, consciously or unconsciously, by the philosophical assumptions of the researcher (Guba & Lincoln, 1994), it is crucial (in our context) that the researchers be more gender aware so that access, and usage of mobile technologies can better reflect the needs, situations and constraints of women in rural contexts (Bonder & Buskens, 2015; Potnis, 2014). In this regard, I discuss some challenges that I experienced as a female researcher during my field research with female participants in rural India. Potnis (2014) has highlighted certain challenges that male researchers face while interviewing female participants. He mentions that often female participants do not recognise the male researcher in presence of their husbands. In other instances, he argues that the male members of the community often tend to discourage female participants from getting involved in research studies. He also points out that women often feel inhibited in taking part in surveys or in narrating their experiences with using mobile phones. Lastly, the issue of interference from male family members is also documented. Potnis (2014) further contends that male members often respond to the phone calls made to women participants in an attempt to know the purposes of such calls, especially when these calls are made by male researcher.

Such challenges were mitigated to some extent as the researcher is a female. The female author's strengths related to this project were: family bonds in India; exposure to the problems and counselling of maltreated women in India (through the maids at her house; awareness of cultural value in northern India, and her ability to communicate in Hindi). During the research visit, a female representative from the company accompanied her to the field site. Initially, I spent some time with the participants engaging in casual talks to get comfortable with the females. The first day I had meals with them. A female member of the group mistook me to be a representative from the bank and asked if I had any problems with the way they are handling loans and bank accounts.

Following, such concerns I spent some time with them explaining my work. Unlike issues faced by male researchers, the females in the study were much more comfortable discussing their problems and issues with using mobile technologies. Some women requested me not to disclose the fact related to ownership of the mobile phones to their in-laws and family members. One of the key logistic challenges in conducting face-to-face interviews with the poor women is deciding on a common meeting location where they would feel comfortable in sharing their personal stories, and experiences of owning and using mobile phones. To resolve this issue, I conducted the interviews at the weekly meetings in Cashpor branch offices. A typical meeting site is depicted in Figure 12 below.

Each center meeting lasts for about 45 minutes and is conducted with a group of 15 women sitting in a circle facing the loan officer or the center manager. Once the loan installment repayment process is complete, the center manager invites the women with savings accounts to save. The women pass their money, phone and code booklet to the center manager, who performs the savings transaction on the mobile phone, writes the deposit or withdrawal in the booklet, and returns the phone and booklet to the client. Out of the 10 women interviewed 6 had a formal source of income. The reported occupations are farming or selling goods such as cow dung cakes, pottery, marigold garlands and scarves.

Figure 12: Cashpor weekly branch meeting. Source: Author's fieldwork

4.4. Key findings

I now discuss how MFIs are implementing mobile banking services to facilitate the inclusion of rural women by addressing their relevant needs. I demonstrate that mobile technologies (in particular mobile phones) form an accessible and affordable channel to deliver financial services. The mobile enabled services enable women to save and do financial planning for their future needs. Next, I explore the links between mobile phones and the livelihood of poor women. In particular, I look at the different ways in which mobile phones impact the assets owned by rural women. I also highlight the role of infomediaries and intermediaries (especially women) in mobile enabled development. The study provides evidence to informal

practices such as “assisted banking” that are necessary in order to serve women (specifically those who are less educated and uncomfortable with using mobile phones). In doing so I differentiate between ownership of mobile and accessibility of mobile. Furthermore, the paper argues that in addition to the mobile technology as a channel to provide banking services, a complex network of intermediaries is essential to facilitate this. Lastly, I outline that a mere device is not enough to enable development. The development is enhanced through active involvement of the women in the design of services. I now look at the key aspects of inclusivity that I discovered during my research. I discuss them below.

4.4.1. Precursors

A key criterion for inclusive innovation is that the problems addressed should be relevant to the marginalized. This study provides evidence for this criteria as the lead organization provided these services in order to enable women to save. As one respondent mentions:

They (women) are unable to save money. Previously the money which we lend to them was frequently snatched away by their husbands or got spent on other household expenses. Thus, our goal to help empower women to start some activity was not fully attained. We provide them with a saving opportunity at their door step (Dhananjay, Business Correspondent Channel Officer, Cashpor).

Even in the rural areas, those few who do have access to banking facilities find it difficult to manage the accounts. Women have to travel to the cities to operate their bank accounts, forego their household work or other activities. Surbhi, training manager corroborates:

Making repeated visits to the bank to deposit and withdraw such small sums of money (50 rupees or even less at a time) is cumbersome and economically unfeasible. Also, the perception is that customers making such small deposits are not valued at banks.

4.4.2. Adoption

Inclusive innovation requires that innovation should aim at providing services that could be accessed and afforded by the excluded group, and that it has the willingness, skills and capabilities to absorb the innovation. While formal banking channels have existed, accessing and affording them has been a challenge for the rural poor. My study highlights that mobile banking services are affordable and accessible by the rural women and some even have the capabilities to use the services. This is further illustrated by maintaining the mobile number of the women as their account number.

As Sakshi, senior training manger mentions:

Our clients find it easy to remember the mobile number. So they need not make any effort to store their bank account details.

She further argues:

Even their family members can do the transactions sometimes (for example a balance check) as it is only number dialling.

4.4.3. Product and processes

Inclusivity of process suggests that the marginalized are involved in the design and development of the innovation. Inclusive innovations often modify existing products or services to meet the needs of disadvantaged groups in a better way. This can be achieved

through introducing innovations in their existing products and business operations. The case study highlights such forms of innovation. First, concerned about the financial burden that buying a mobile phone could put on clients, Cashpor, in 2013, introduced a special loan product called Cashpor Mahila Sashaktikaran Loan (Cashpor women empowerment loan) of up to 1,000 rupees specifically intended to purchase a new mobile phone for opening a savings account and to operate existing savings accounts (Cashpor, 2014). This loan is in addition to the ones Cashpor normally provides (as a part of its MFI business). As a loan officer, Ramdev further explains:

In the first year of operation, we realized, many women would borrow mobile phones from their families or just buy the phone card and use it in another's phone. The latter case was problematic…as they often tend to misplace the phone card. This created troubles for operating accounts through the mobile phone. This led us to introduce this new loan product.

In addition, two process innovations were also introduced and these have enabled Cashpor to develop processes to deal with problems related to rejection of account opening forms and dormant accounts. First, the account opening form was digitized and that reduced the time taken to open savings accounts. There used to be long time gap between applying for an account and being able to make a transaction. This reflected negatively on adoption and usage of mobile banking. To counter these concerns Cashpor started to digitize all the account opening forms.

Second, an account opening form tracker was developed to track the movement of account opening forms and eliminate redundancy. This reduced the time taken to open accounts from 120 to 20 days (Grameen Foundation, 2013b). Furthermore, Cashpor has been able to use the processes developed as part of this innovation to offer other financial products as well, for

instance the use of the account opening form tracker to support a pension product (Grameen Foundation, 2013d).

My study also highlights that inclusive innovation could be facilitated through the use of existing channels for providing additional services. Cashpor made use of its existing infrastructure and staff (loan officers and branch managers) from the micro credit operations to deliver mobile banking services to the women. As part of its channel innovation, Cashpor focused its efforts in training their loan officers about sales training and customer service. This practice came through the issues faced by Cashpor with mobile banking (a new product).

Cashpor introduced a new way of delivering financial services, i.e., they offered the savings services through the existing credit channel. Therefore, it was initially difficult for women to comprehend that the same people who provide credit are now providing branchless banking. So, the loan officers had to change their way of interacting with the women. They would talk about the advantages of bank accounts (Nitin, consultant in mobile money, employed at MicroSave, a consulting firm).

Additionally, Cashpor provided incentives to the loan officers for enrolments in mobile banking and integrated these in the performance evaluation system. In addition, it expanded its focus from opening mobile based bank accounts to include regular mobile transactions and the maintenance of average daily balances (Grameen Foundation, 2013a). Cashpor also launched a short-term incentive scheme "Saving ka Sultan" (Sultan of Savings) to boost enrolments and transactions. This scheme ran for three months and was successful in motivating staff and resulted in boosting enrolments (Grameen Foundation, 2013d).

4.4.4. Innovation impact

An innovation is considered as inclusive if it has a positive impact on the livelihoods of the marginalized group. A promising way to understand this form of positive impact is in terms of the impact on livelihood assets. Our research uncovers the ways in which provisioning of mobile technologies by MFIs impacts the assets owned by rural women.

Mobile phone as the key tool to enable improvement in asset

Mobile phones have considerable impact on the livelihoods of the low-income users (Duncombe, 2014). Livelihood analysis emphasizes the measurable changes in asset status. This study uncovers the ways in which mobile technologies change the status of assets owned by the rural women.

a) **Asset substitution:** Mobile technologies are tools that enable direct substitution of assets such as money. Our findings suggest that mobile banking services help women save money that they would have spent on travelling to banks in the cities. Additionally, the mobile number is linked to the bank account number serving as the financial identity.

Satyavati, a female that had an account with another bank (but then closed it) responds:

It was difficult earlier to remember the bank account number. So every time I had to carry my passbook to the bank. But, now with the mobile service it is very easy.

b) **Asset enhancement***:* Mobile banking services can enrich existing assets and enable efficient utilization of resources such as time. For instance, some females who had small businesses talked about the trouble they face in accessing the bank accounts in the cities. As Paro argues:

To go to bank you need a full day. I cannot do anything else in that day and even worse I have to rely on my in-laws for the chores and they often moan. Mobile banking has given us the facility to save time and utilize that time for household chores and business activities.

Mobile phone based services also enhance human capital. Our respondents reported increased confidence in using mobile phones and even smartphones. As Kalawati puts it:

I was apprehensive to use mobile phones earlier. Some people mock if you use it. They tell it is not meant for you. Go and work in the home. Now after saving money and seeing and doing transactions, I feel confident using mobiles. Sometimes, I also listen to radio on my phone.

c**) Asset improvement*:*** This implies putting existing assets to productive use (Ellis, 2008). For example, the mobile enabled savings are used for education of their children. In addition, new mobile innovations are building upon mobile money to provide mobile services such as recurring deposits and fixed deposits for women. Many women use mobile banking to reduce risk in their lives. For example, as Pushpa remarks:

There could be an emergency in the future, for example, last month my mother was severely ill with pneumonia, we admitted her to hospital. So now the money I saved is utilised for her treatment.

Nitesh, another loan officer, conceives mobile enabled savings as a risk management tool and thus, commented:

Access to mobile based savings acts as a shield against shocks (situations where they urgently need money but are unable to arrange it.

Thus, mobile savings aid asset improvement and help the women to plan for the future and mitigate the risk of unforeseen expenses and unreliable incomes.

d) **Asset disembodiment:** The mobile phone is identified as a tool "*that can disembody (divesting material form into virtual form) assets which are then represented according to particular software designs or network architectures"* (Duncombe 2014, Pg. 570). Through mobile banking, the information related to bank accounts are now codified and stored in the form of messages and numbers. As Kalpana replies:

If I have to check account balance, I just dial the number and I get a message. All transactions are stored in the mobile phone as messages.

e) **Asset exchange and combination:** This is illustrated by unifying the mobile number and the bank account number. The mobile number is linked to the bank account number serving as the financial identity. In addition, real cash is converted into virtual currency at the door step. As Shanta, argues:

My mobile number is the bank account number and it is easy to remember. We can withdraw or deposit money in our village.

The specific banking transaction that could be conducted over mobile phones (i.e., they are able to handle monetary transfers of small denominations, thereby lowering the transaction costs) are useful for rural women. The rural females feel a greater control over the money they own; empowering them to take their own decisions. They are able to store and transmit personal financial data, and transfer monetary value at their door-step.

Dhani, a mother of two mentions:

Who entertains you for depositing and withdrawing 10-20 rupees? Bank branches, do not want this small amount and make us wait a lot. But, with mobile banking I am able to save 10 to 20 rupees each time the meeting is held. I do not have to ask anyone for saving small amounts. If it is a big amount, I may have to ask for my in-laws or husband's permission.

Another instance where I found evidence for asset combination was the presence of both credit and savings functions. Providing mobile enabled services ensured that in cases of non-payment of monthly instalments, the burden does not fall on the group as a whole.

As Biswas, another loan officer argues:

Earlier, sometimes the women were not able to repay their loan on time as they did not have money. But now they save money and make timely repayments of their loans.

In many cases, I found out that mobile phones represent a form of *joint asset* for some women. Bindu, for example, mentions:

My husband owns the phone, but it is a considered a household phone, an asset available to everyone under the roof.

4.4.5. Earnings, social bonding and m-powerment

Through its BC operations, Cashpor has helped many poor women come out of poverty and start a small activity. Rajesh, an employee handling BC relations explains:

Earlier, sometimes the women were not able to repay their loan on time as they did not have money. But now as they save money they make timely repayments of their loans. It also helps them save for future purposes such as the education of their children and give them a better

life. Others need to protect their money from their husbands who use the money to buy alcohol.

Evidence from our case study also suggests that women become more independent and influential in their homes. For example, Abhi, a branch manager with Cashpor argues:

Earlier some women would have to ask permission from their husband if they wanted to buy something. As they are able to save now, they feel more determined and empowered to make their own decisions and influence family decision-making.

In addition, Cashpor provides a cost effective manner for saving money. Abhi, further elaborates:

The cost of saving 2 dollars in a conventional bank is more than 2 dollars. It is inconvenient…they need to go out of their village…queue up in long lines...think if the money is at home it will get spent on something but if it is stored in Apna account it is saved conveniently.

All the fifteen women clients interviewed mention the usefulness of mobile-enabled savings and how it made them feel financially independent. The average amount deposited was 30 rupees. The savings, though of small monetary values, helped them in difficult times, for example, when it came to repay their loan instalment or to invest in a small business activity such as a tea stall.

The average savings deposit is 351 rupees (around US$6) although small in absolute terms it means a lot to the clients who for the first time had a cushion to fall back on in difficult days (from Cashpor annual report, 2013-14).

I deposit 20 rupees every week at the center meeting. Sometimes I deposit more. I saved 500 rupees. Me and my friend opened a small tea stall. We earn a small amount and my savings helped (Kalpana, Cashpor client).

Another woman mentioned how mobile-based savings resulted in better bonding with other women.

If I am unable to pay the installment for my loan, other women in the group withdraw small amounts from their accounts and pay my installment due. We take the responsibility for the whole group (of 25 women) (Shanta, Cashpor client).

The women in the group feel more responsible towards each other. For example, those who are comfortable using the technology help and teach the older women in the group who do not know how to use mobile phones to check their balance and teach them how to sign their names. In addition, some women came to know other women while registering for these services.

Pushpa, a lady that recently moved into the villages contends:

I came to know many women more personally through these services. We sit in a group and do the transactions one by one. Now I know a dai (traditional Indian midwives) and she will help me with my delivery.

4.4.6. Infomediaries, intermediaries and mediated usage

The role of intermediaries in inclusive innovation is considered very important. Cashpor as a BC serves as an intermediary between customers and the ICP bank. The key role in enabling mobile-based savings is played by the loan officers at Cashpor who interact with the women

each week. The women clients attend weekly meetings in which the loan officers collect the loan repayments, deposits, make withdrawals and open accounts. Inclusive innovation systems need to recognize informal institutions i.e., the behavioral norms embedded within local social relations (Shirley, 2008).

In many cases the loan officers perform 'assisted banking'. As one of the loan officers explained:

Many do not own mobile phones so they borrow. Some are not comfortable doing the transactions so we perform the transactions on their behalf on our mobile phones. But we teach them and after a few meetings they start doing it themselves (Vivek, loan officer, Cashpor).

Figure 13: A women depositing 20 rupees in her account. Source: Author's field work

In Figure 13 above, a loan officer carries out the transaction on the mobile phone of the women, a characteristic instance of assisted banking.

Another instance where the loan officers are indispensable is in their role as Infomediaries. Infomediaries are individual members of a community who are actively involved in providing local and in some cases, confidential information to the community and in diffusing multiple sources of information within the community (Gould, Gomez, & Camacho, 2010).

Infomediaries help to bridge the information needs of Cashpor and the women clients. Infomediaries assist capacity building in marginalized communities because they help to connect people and communities with technology especially, the individuals who are illiterate or less educated. An independent consultant elaborates:

Cashpor introduced a new way of delivering financial services, i.e., they offered the savings services through the existing credit channel. Therefore, it was initially difficult for women to comprehend that the same people who provide credit are now providing branchless banking. So, they had to change their way of interacting with the women. They would talk about the advantages of bank accounts (Nitin, consultant in mobile money, employed at MicroSave, a consulting firm).

In addition to the intermediation by male loan officers that undertake assisted banking, I also examine the role of female intermediaries in inclusive innovation. Being an intermediary, an increasingly important role in communities of rural women offered a choice that was previously not available to women (Oreglia & Srinivasan, 2016). In addition, intermediaries: *"are not passive entities; they navigate their way within these roles and create "spaces of development" for themselves"* (Bailur & Masiero, 2012, Pg.28).

In our case these female intermediaries were members of the same group but were more comfortable with using mobile phones. They were also the first ones to enroll in the mobile savings product and so were comfortable in doing the transactions as well. In the meetings that I attended these intermediaries emerged with considerable authority. In one instance, Pyali, a middle aged women reprimanded some women who arrived late for the meeting and asked:

Where have you been? Why did you turn up late? I taught you to do the mobile transactions so that you come on time and do the savings.

She even encouraged others to do the transactions on their own, As Dhani, puts it*:*

I use my husband's phone but I did not know how to use it. Didi (Didi means elder sister and she is referring to Pyali) taught me how to check the message, check the balance on the phone and do the transaction. Now, I am no longer hesitant.

Furthermore, these women intermediaries who are comfortable with using technology are the ones who encouraged other women in their village to open mobile based savings accounts. As Bindu praises Pyali and further explains:

Didi is the leader in her group, she knows how to dial the number, do savings on the mobile and she helps others with their phones. Besides, we also take her advice on other matters such as the choice of mobile phone and network operator.

4.4.7. Mobile phone: the silver bullet or the inclusion mantra?

Given the limited ownership of mobile phones, it is crucial to understand whether women do really have the capabilities of absorbing inclusive innovation. Clearly, just a mere device (i.e.,

mobile phone) cannot be considered as a silver bullet that could get rid of traditional patriarchal attitudes (Walsham, 2013). Thus, the involvement of women in the design and development of services is essential. For example, women previously used the accounts as a means to save money and make infrequent transactions. The account opening charge of 100 rupees and the cost of transactions act as deterrents for women to use their account frequently (Grameen Foundation, 2013c). Now customers have the option of either paying 50 rupees (US$0.9) per year for unlimited transactions or 2 rupees (US$0.03) per transaction. Cashpor earns commissions paid by ICP Bank of 20 rupees (US$0.33) for every new account and 1 rupee (US$0.02) for every transaction. However, this is only the case in their partnership with ICP Bank. Women clients themselves and through the loan officers have often expressed their discontent at the account opening fees levied. Cashpor, along with its partners, has incorporated this feedback in redesigning the services. As Sakshi mentions:

After multiple streams of feedback from women and other loan officers related to the account opening fees, the fees are now waived.

Particulars	**Financial year 2013-14**	**Financial year 2012-12**
Average savings balance	346 rupees (US$5.5)	386 rupees (US$6.1)
Deposits mobilized	196 million rupees (US$3,149,104)	80 million rupees (US$1,430,260)
Withdrawals	141 million rupees (US$2, 265,917)	56 million rupees (US$899,939)
Number of savers	196,080	123,487
Percentage of active savers	76	83

Table 6: Savings details. Source: Cashpor annual report 2013-2014)

More recently, Cashpor has enrolled as a BC for Inde Bank as well and provides savings accounts on behalf of the bank. Cashpor has opened 69,458 savings accounts with a total transaction volume of 12 crore rupees (about US$2 million) (Reserve Bank of India, 2014).

In addition, Cashpor also brought out two new products in this financial year to add to the BC savings account offering: recurring deposit accounts and fixed deposit accounts to provide long term savings facilities to its customers. Table 6 shows these savings details.

Though the choice of technology is made considering the economic and social background of the female clients, there are certain informal practices that have emerged as crucial ones to deliver mobile based savings. For example, concerned about the family composition of the females (many live in joint families with their in-laws and decisions are taken jointly), the loan officers do not inform any family member about the amount held in the accounts.

4.5. Discussion

MFIs, mobile technologies and inclusive innovation

My study points out that the role of MFIs is not restricted to acting as an agent or intermediary on behalf of clients. MFIs in enabling inclusive innovation take a more active role introducing minor innovations in products and processes. In addition, MFIs that enable inclusion through mobile technologies often engage in providing incentive structures to their staff and thus need to provide appropriate skill development mechanisms to the employees.

MFIs and the loan officers serve as crucial intermediaries to support the delivery of the product. Informal relations and institutions represent a core element of inclusive innovation systems. The informal practices of assisted banking and using borrowed mobile phones to conduct transactions proved necessary to support inclusive innovation. In addition, this research emphasizes the role of innofusion intermediaries such as the loan officers in enabling the inclusion of women. These intermediaries develop local innovations in practices and processes and enable the diffusion of ICTs. For example, the loan officers at Cashpor

actively interact with the women to ensure that they use the mobile based accounts regularly. This has significantly reduced the dormancy rate. In addition, these intermediaries assist the women in conducting the transactions over mobile. For example, after doing the transaction, the loan officer informs the women of their account balance and updates their booklets.

More specifically, the study addresses the development impact of inclusive innovation. This is viewed as consisting of six different levels with each succeeding level representing a greater notion of inclusivity with impact evaluation at the third level (Heeks et al., 2013). To address the development impact of inclusive innovation, the value of inclusivity of intention (level one of inclusive innovation) and consumption (level two) needs to be acknowledged. Thus, before discussing the impact of inclusive innovation at the third level I discuss these aspects.

An innovation is inclusive if the abstract motivation of that innovation is to address the needs or problems of the excluded group (level 1: Intention) and if it is adopted and used by the excluded group (level 2: Consumption). These conditions exist in my study. Amongst various reasons for Cashpor to provide such innovation, one key factor was to provide mobile-enabled savings accounts to poor women. In addition, the pricing of these products was kept low in order to make them affordable. Furthermore, training sessions on financial literacy and technology usage were organized to impart the capabilities to absorb the innovation.

Another perspective on the positive impact of inclusive innovations can be seen in terms of equality of the benefits. This implies a condition that the benefits were restricted to the excluded group, or were greater than those gained by 'included' groups using the innovation (Heeks et al., 2013). In our case, the ability to have a safe place to save money is a benefit that is valued most by poor women in rural areas. Normally, these women either are unable to

save money (as they were unable to access existing banking services or the money was spent elsewhere) or rely on informal and unsafe ways to save money (such as in rice bags that were torn by rats and the money lost). Sometimes family members took away that money. Thus, the benefits of accessing bank account and savings services were greater for these women in our case as compared to their counterparts in urban areas who are more independent and already have access to a formal banking infrastructure. Thus, the impact evaluation for inclusive innovation is both absolute and relative. The benefits of inclusive innovation should accrue at an absolute level such as improvements in livelihood and well-being of the excluded and in addition, at a relative level where the impact evaluation implies that the benefits should be greater for the excluded group. Thus, the impact evaluation is a crucial element of inclusive innovation especially at the demand side, the users of such innovation.

Mobile technology and livelihood assets

Mobile technologies such as mobile phones facilitate asset enhancement, substitution, combination and forms of disembodiment. MFIs, by leveraging mobile technologies could significantly change the status of the assets owned by the women. For example, by providing mobile banking services at the doorstep, it encouraged women empowerment, enhanced social capital and economic stability (mobile financial services are often used as a risk mitigation strategy to plan for instable income flows and financial emergency).

In line with Duncombe (2012), I identify three different categories of assets. First, *"resource based assets"* comprise of the tangible assets and include physical and financial capital. These assets are tangible in nature and could be measured using quantitative economic perspectives. In our case, these assets are in the form of deposits, savings mobilized, and active accounts. One such specific example is the Apna savings account that enabled many

women to save for their long-term future needs such as education of their children and for emergencies such as unforeseen medical expenditure. In addition, better savings opportunities enabled the women to expand their existing activities by investing the saved money in their small scale activities. For example, as of March 2013, more than 120,000 customers have opened accounts with an average savings balance per customer of 248 rupees (US$4.16) (Grameen Foundation, 2013c). I discussed how mobile phones can change the status of physical assets owned by women. I also highlight that the mobile phone itself is considered as a physical asset jointly owned. This contention is important considering the subject of my study, i.e., rural women. Women, especially those in rural areas are often unable to own or access mobile phones due to several cultural and social constraints. Thus, my study has important implications for livelihood analysis, the primarily one is to consider the mobile phone as a joint asset.

The second class of assets is the *"network-based assets"* that encompass social, political and cultural capital and are often viewed as 'intangible' resources. These include group membership, relationships, trust and reciprocity and are less easy to define and measure. This research also reflects an enhancement of these assets. For instance, the increased social bonding and social status within the families were evident in our case. My study also points out the role of mobile phones as an information asset. For example, using mobile phones for listening to news over radio and accessing information (checking account balance).

The third category is termed as, *"cognitive-based assets"* and includes human and psychological capital – including local knowledge, capabilities and skills. Such assets in my study are endowed in the form of social and human capital related to the confidence women acquire in using mobile phones (even though I highlighted the practice of assisted banking).

Human capital refers to the increased connections women make with dispersed networks such as dai (midwives) through using these mobile based services. I also instantiate that mobile phones not only serve to enhance cognitive assets for women but also for their family members. This is the importance of conceiving mobile phones as joint assets. The mobile phones are used by their children to play games and to store the names and contact information of school friends.

Along with the mobile phones that represent a fairly low cost ICT (as compared to kiosks and telecentres that require considerable investment), MFIs need to build a stable network of intermediaries and infomediaries. Such informal actors are crucial to realise the development objective of the inclusive innovation. In particular, female infomediaries play a central role in mobile enabled development. The active role played by the gatekeepers and infomediaries in aiding the access and ownership of mobile phones is particularly relevant. Studies of mobile phone usage in developing countries have highlighted social, psychological and cultural factors as significant hurdles to adoption and usage (Duncombe & Boateng, 2009). To overcome these hurdles, the role of female intermediaries is crucial as they teach the various ways of using mobile phones and in many cases also emerge as leaders in their group.

Finally, I argue that mobile technology does not enable the same level of development for all women. Particularly, in our case I noticed that the development is higher for the women gatekeepers than for other rural women. Although mobile based savings provide an equal opportunity for the women, its development outcomes are not the same. I also emphasize that young and educated women are more likely to benefit from such services than those who are old and uneducated. The latter group in many cases consult the former group and loan officers to use mobiles and conduct transactions.

Researcher and the subject

Finally, I reflect upon the role of researcher in my study. Given, the focus of my study (rural women with low levels of education), I emphasize the importance of field work in such communities. Once I finished my field visit and research work, the women invited me to take tea. The warmth and the sense of belongingness I felt left me touched. At times I even ponder if us researchers are far away from the day to day struggles of the lives of the people researched. For example, in one meeting, the center was loaded with cow dung cakes and it was initially difficult for me to imagine the conditions in which the females lived. Thus, I argue in favor of more field studies especially with rural women.

4.5. Conclusion

Mobile technology is considered as an intermediating tool that can bring together and coordinate the market (banks, MFIs) and non-market actors and institutions (women and marginalized) to facilitate greater inclusion. Thus, when mobile technologies are the preferred delivery channel, market models for information delivery and exchange tend to dominate (Duncombe, 2012). The risk involved in focusing solely on potential of mobile phones as a delivery channel is that the sustainability of this market based model is likely to be determined according to the willingness and ability to pay for services and information (Duncombe, 2012). Such risks could be mitigated by the combined efforts of appropriate stakeholders such as MFIs and a network of innofusion intermediaries. Furthermore, this study also provides evidence of how such risks could be avoided, by incorporating inclusive innovation criteria, for example by focusing on local needs. Thus, the mere choice of mobile phones as a channel is necessary but not sufficient. A thorough investigation of the relevant mechanisms to deploy mobile banking services needs to be undertaken. Mobile phones are

emerging as an important information asset (specifically as the new account number) emphasizing a multitude of alternative uses technology brings.

Even with technology as basic as the mobile phone, it is important to include the marginalized in the design and development of services (inclusivity of processes). In conclusion, my study suggests that MFIs leverage mobile technologies to enable inclusion for the marginalized, the extent of the inclusion being differential. It is hoped that the analysis will provide useful insights for researchers, practitioners and policy makers. I encourage the research community to do more field work related to rural women (especially those who live below poverty lines). Practitioners and policy makers should provide for other related solutions that could be accessed through mobile technologies (not just a plain savings account but other related products such as fixed deposits and recurring deposits). They also need to understand that in Indian culture, especially in rural households, females are considered as better savers and thus, it makes more sense to reach out to this user group. Finally, I contend that the mindset that the poor cannot pay needs to be changed. It is fair to assume that the poor are more sensitive to price changes but they do have aspirations and the willingness to pay.

5. Conclusion and future research

Expanding on the three papers presented in chapters two, three, and four, this conclusive chapter summarizes the contributions, limitations and implications of these findings. I also discuss options for future research in this area.

Two empirical studies

This dissertation discusses the creation, implementation and scaling of an ICT for development initiative in an urban and a rural setting. The two studies illustrate a number of innovations in products and processes introduced by the lead firms, albeit of different kinds. These two studies also highlight the difference between the strategies of the lead firm. The first case Alpha built its infrastructure from scratch and thus the innovation that followed was more iterative in nature. In the other organization, the nature of innovation was adaptive. Both the firms dealt with customers that had basic primary education and thus it took extended efforts to build the customer base. Lastly, while in an urban setting the product focus remained on remittances and mobile banking, in rural areas mobile banking services (mainly savings) were the key product.

Theoretical contributions

ICT for development and scaling

A number of studies have highlighted the difficulties and challenges that ICT for development projects face (Foster & Heeks, 2013; Sahay et al., 2013; Sahay & Walsham, 2006). In addition to the hurdles in achieving scale, are the challenges that organizations such as social enterprises face (primarily because of the resource constraints and their focus

towards the BoP) as many of them do not achieve scale. Paper I seeks to explore this dilemma, especially in cases where the lead is taken by a social enterprise that was a start-up. Incorporating perspectives from bricolage, this study concurs with Ravishankar (2016) that in addition to being an antecedent to innovation and entrepreneurship, bricolage is an orchestrated strategy as well. Delving deeper, this study also argues that resource bricolage is alone not sufficient to achieve scale, rather it is the other forms of bricolage such as institutional bricolage, network bricolage, collective bricolage and creation of new entities that emerge as probably more important ones on the pathway to scale. This dissertation, identifies seven phases that could be considered as important to achieve scale when the lead is taken by a third party actor such as an ICT social enterprise (Alpha) – an inquiry that has been called for by Foster & Heeks (2013).

Business models for the bottom of the pyramid

This dissertation also provides useful insights to the literature on business models for the bottom of the pyramid (BoP). The BoP is an important market for many organizations, both in terms of size and volume. Unsurprisingly, many firms target this market in attempts to capture the fortune at the BoP (Prahalad & Hart, 2002). Firms have continuously turned their attention towards these economies to take advantage of the growing consumption which is predicted to create a market of US$30 trillion by 2025 (Atsmon et al., 2012). Many innovations in ICTs such as a hole in the wall have been introduced mainly because of the potential of technology to reach out in these markets (Dangwal et al., 2005). However, firms continue to struggle to get right business models and thus, are not able to offer viable products. This dissertation contributes to identifying 5 key dimensions of business models that could be considered as appropriate to deliver ICTs to the BoP. An extension to Al-Debei & Avison (2010), the dissertation proposes to consider the value network as an innofusion

network and suggests to add another new dimension of value co-creation. The rationale behind including an additional dimension of value co-creation is to acknowledge the role of consumers as prosumers and that value to the consumer emanates from the joint efforts of the stakeholders. The two dimensions: innofusion network and value co-creation highlight the specific context of emerging economies that is characterised by informal relations, weak or absent institutions, lack of adequate funds and resource constraints. These two dimensions reflect the social aspect of business models, an important deviation from the commercial logic that formed the basis for V4BM proposed by Al-Debei & Avison (2010).

MFIs, inclusive innovation and mobile technologies

In paper III, this dissertation shifts the focus to a rural setting and to women specifically. Adopting the emerging perspective of inclusive innovation, this dissertation identifies the ways in which MFIs leverage mobile technologies to foster inclusive innovation in communities of rural women. This dissertation highlights that inclusive innovation requires a network of intermediaries and infomediaries. Furthermore, it expands upon the impact that inclusive innovation could have in marginalised communities. In particular, with inputs from asset livelihoods, it demonstrates that inclusive innovation (through mobile technologies) results in changed status of the assets (for example, through asset substitution, asset modification, asset combination and asset exchange). It further argues that inclusive innovation systems need to put appropriate incentives and skill development measures for the stakeholders at the supply side (in my case the loan officers). This dissertation also emphasized the role of informal practices that exist in inclusive innovation systems (through assisted banking in my case). Innovation here was adaptive (modifying existing products) and a number of innovations were introduced at technological, operational and organizational levels.

Mobile banking - a different perspective

Much of the research within the stream of mobile money and banking has focussed on Kenya and certain other African countries. This dissertation departs from this convention and looks at the case of India where organizations that provide mobile banking services are required to work with banks (hence the business correspondent model). This dissertation highlights the challenges of implementing mobile money services in a crowded and competitive market such as India (Gupta & Tahilyani, 2013; Gupta, 2013). Our study reveals that even in markets such as India where some level of infrastructure exists (Airtel, the MNO that owns Airtel money has a considerable customer base and a distributed network of agents), context specific conditions such as stringent regulations and competitive markets make it difficult for organizations to succeed.

Practical implications

This dissertation also offers insights for organizations that wish to operate in emerging markets serving the BoP. While markets in developed economies share many similar features, markets in emerging countries often have more differences than commonalities. Organizations try to follow a replication strategy, but often struggle to succeed, for example, Vodafone in both India and in Tanzania. In line with Barrett & Orlikowski (2014), I argue in favour of an exploration strategy that allows for experimentation, iteration, and adaptation needed for learning. In addition, I also suggest that organizations adopt an exploitative strategy that seeks to utilize available resources and exploit opportunities that exist in the form of institutions and informal relations. Thus, while digital innovations offer a powerful opportunity for doing business in developing markets, they often require a strategy of exploration and exploitation.

Future research

This dissertation attempts to contribute to the literature on innovation and scaling in the context of ICT for development; however, it has also revealed some new research questions in this area. In this regard, there are two interesting potential avenues for future research: studying institutional work at platform level and comparing the case firm with M-Pesa. In the first paper of the dissertation I investigated the scaling process of an ICT social enterprise and demonstrate the key phases in the process. However, taking a different perspective, one of the most promising research avenues might be to investigate the overall ecosystem and explore what actions different actors undertake to facilitate the growth of ICT initiatives. Industry ecosystems (also referred to as platforms) are technological building blocks that act as a foundation upon which an array of firms, organized in a set of interdependent firms, develop a set of interrelated products, technologies, and services (Gawer, 2009; Tee & Gawer, 2009). The current research on platforms has tended to reduce the nature of the relationship between the platform owner and users to that of a seller–buyer without considering that customers are active contributors and collaborative innovators.

Eisenmann, Parker, & Van Alstyne (2011) explored the multi sided nature of the platforms and argued that platforms are divided across different levels (platform sponsors, providers and users). Furthermore, Gawer & Phillips (2013) investigated how platform leaders engage in institutional work to respond to changing industry logics. Despite considerable advances to knowledge around platforms, our understanding about how platforms emerge and evolve over time remains limited (Gawer, 2014).

ICT solutions such as mobile money are multi sided platforms, and such forms of institutional work might be undertaken by the joint efforts of platform sponsors, providers

and users. The key here is that platform creation and evolution should not be understood as exogenous events, but as something that is socially constructed by organizations via their ongoing and cumulative responses to institutional changes. Lawrence, Suddaby, & Leca (2011, Pg.21) define institutional work concisely as "*the practices of individuals and collective actors aimed at creating, maintaining, and disrupting institutions"*. In explaining the nature of institutional work, Lawrence & Suddaby (2006) explicitly identify nine types of work aimed at creating institutions: *"vesting, defining, advocacy, constructing identities, changing norms, constructing normative networks, mimicry, theorizing and educating."*

With multi sided platforms (for example, mobile money platforms), such forms of institutional work might be undertaken by the joint efforts of platform sponsors, providers and users. Future research could therefore ask the question: How do mobile money platforms emerge, develop and disappear?

A second potential line of inquiry could be focussing on the CSPs or the agents and look at their practices that enable platform adoption by customers. I accessed a dataset collected in India that mainly considers the CSPs in the ecosystem. The dataset provided by Mehrotra & George (2015) could be further analysed quantitatively to generate useful insights about the CSPs or the agents in the mobile money ecosystem.

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Appendix I

Scaling ICT in a constrained and competitive environment through 'Jugaad': A case study of an Indian start-up targeting BoP customers

Abstract

This paper looks at an Indian start-up operating in a very challenging and competitive environment, coping with resource constraints and yet scaling into a powerful mobile payments company despite dealing only with bottom of the pyramid (BoP) customers. The case study takes place over a seven-year period from 2007 to 2013. The scaling evidenced by the company gained from 'Jugaad' innovation, which is somewhat different to improvisation and bricolage. Jugaad innovation is about spotting opportunities in adverse circumstances to develop effective solutions using simple means and very limited resources at the BoP. Whereas bricolage sometimes suggests low quality, Jugaad is trying to achieve 'more for less': aiming to result in cheaper products that retain and enhance core functionality. Thus the company dealt with Kirana stores (Indian street stores where transactions are for small amounts) to reach BoP customers using the most basic mobile units these customers are likely to possess, and dealing with illiterate, unbanked and itinerant workers. Scaling of ICT itself is an understudied phenomenon, and rare at the BoP level, and the case study describes a rich scaling success story.

Keywords: Scaling, Jugaad innovation, Bricolage, Improvisation, Bottom of the pyramid (BoP), Mobile payments, India, Case study.

1. ICT innovation and scaling

Some organizations are beginning to use information and communication technologies (ICT) in an attempt to address the socio-economic development of people at the bottom of the pyramid (BoP) in the developing world (Abraham, 2007; Brewer et al., 2005; Kuriyan, Ray, & Toyama, 2008). These people tend to have high illiteracy rates as well as low income and may be unbanked which makes them difficult to reach. Other challenges hindering the development and implementation of ICT-based products in the developing world, include high cost, low return and high risk of investment, as well as a lack of adequate infrastructure (Touray et al., 2013).

Nevertheless, a number of pilot projects have focused on providing ICT-led solutions to help BoP customers (Kuriyan et al., 2008) but because of the challenges mentioned above, many of these initiatives fail to grow beyond pilot projects (i.e., to scale) and generate revenue (Heeks, 2008; Walsham & Sahay, 2006). Therefore, although ICT-based innovation offers potential for market development at the BoP, the economic and social impacts of such innovations remain unclear and there are many examples of failure (Avgerou & Walsham, 2001; Walsham & Sahay, 2006).

More recently, some firms have leveraged mobile technologies by offering mobile-based solutions to BoP customers. The most well-cited example of these is M-Pesa in Kenya (Mas & Morawczynski, 2009). Such solutions include mobile-based payments, defined as*" the use of mobile devices to initiate, authorize and confirm an exchange of financial value in return for goods and services"* (Au & Kauffman, 2008). In some developing countries, financial services are now being offered to consumers who do not have a conventional bank account thus enabling efficient interaction between producers and BoP consumers (Tarafdar, Anekal,

& Singh, 2013). Mobile phone subscriptions in developing nations have increased from 1213m to 5235m between 2005 and 2013 (ITU, 2013). Thus mobile phones have emerged as a strong potential enabler for providing ICT-based products in developing economies.

One crucial challenge related to ICT-based innovation that remains for companies is that of scaling. In the context of information systems (IS), scaling is *defined as the expansion of the system in scope and size* (Sahay & Walsham, 2006), where ICT projects might move from pilot to full-scale by, for example, adding new users, expanding core functionalities and/or broadening its geographical market area.

An inquiry into this scaling process is crucial for a number of reasons, in particular:

a. Scaling represents an understudied phenomenon and there are few accounts and little theoretical understanding of the scaling process in the ICT innovation literature (Foster & Heeks, 2013; Walsham & Sahay, 2006).

b. ICT-based innovations need to deal with the 'chicken and egg' problem before network effects can be accrued: a critical mass of users is needed to generate revenue streams to enable product development and yet there cannot be users without a product (Mas & Radcliffe, 2011). Thus to scale up both consumers and producers need to be present to enable network effects and subsequent revenue generation.

c. Scaling is complex, it is not only about numbers and size, but is a socio-technical problem that involves a heterogeneous network composed of technology, people, processes, and an institutional context (Sahay & Walsham, 2006).

d. As many ICT innovations fail to scale, it is crucial to understand the dynamics of scaling and the processes involved to make scaling more likely (Foster & Heeks, 2013).

To investigate the phenomenon, this paper discusses a case study that concerns a mobile payment start-up in India. The company targeted BoP customers, mainly migrant workers. I look at the company during the period 2007, when at the pilot stage, to 2013. Unusually, the company has managed to scale and is a success story. I use the theoretical lens of resource bricolage and 'Jugaad' innovation to help us understand how this happened. I investigate the role played by different institutions such as government, banks and micro financial institutions as well as small convenience stores during the scaling process. The research question therefore is: *"How did this ICT innovation at the BoP achieve scale?"*

In the next section I introduce the theoretical lens, and then present the research context and methodology. The presentation of the case findings is followed by discussion and a conclusion.

2. Resource bricolage and Jugaad innovation

Traditional innovation demands large resource investment, a characteristic of older and richer firms (Senyard, Baker, & Davidsson, 2011). On the other hand, ICT innovations such as mobile-based payments are considered a radical product innovation (Ondrus & Pigneur, 2007). Whereas conventional companies have significant resources at their disposal, this is rarely the case in ICT startups unless under the control of a more traditional firm. This exception is evidenced by Safaricom, the dominant mobile network operator (MNO) of M-Pesa, as it already had significant resources at its disposal because of its large market share (around 80%), big customer base, strong distribution network, trusted image and budgets to finance the investment needed to deploy the mobile money service in Kenya (Mas & Radcliffe, 2010). This is a very different context to that of the Indian startup that I examine in the case study.

However, firms having resource constraints are sometimes able to innovate through different pathways (Katila & Shane, 2005; Senyard et al., 2011). One such pathway is 'bricolage' which is defined as "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker & Nelson, 2005, Pg. 333). This definition identifies the three key elements of bricolage: 'making do' which indicates active engagement with problems and opportunities; relying on 'the resources at hand' in particular those that are readily available or cheap and the combination of resources available for new effects and purposes. However, this 'making do' element might lead to low quality end products.

Bricolage is often considered to be an element of organizational improvisation (Ciborra & Lanzara, 1994). Ciborra (1996) argues that improvisation implies generating new combinations of resources, routines and structures which are able to deal with the present, turbulent circumstances. More recent work has distinguished between bricolage and improvisation (Baker et al., 2003; Miner, Bassof, & Moorman, 2001). Miner et al. (2001) suggest that improvisation does not permits for temporal gaps between the design and execution of activities. Thus, improvisers have little opportunity and time to seek resources beyond those already at hand and thus, they often tend to engage in bricolage. Therefore, improvisation can be considered an important antecedent to bricolage. However, bricolage also occurs as a part of planned processes (Baker and Nelson 2005; Miner et al. 2001). As Baker (2007) argues, *"while improvisation may imply bricolage, bricolage also occurs in the absence of improvisation"*, and thus they are separate constructs.

Bricolage is also linked to innovation (Katila & Shane, 2005; Salunke, Weerawardena, & McColl-Kennedy, 2013). Although the role of different participants such as users and designers is considered to understand innovation under resource constraints (Garud & Karnøe, 2003), it differs from bricolage in that little attention is paid to the industry

architecture and the business environment that can be leveraged to develop affordable products.

In the mobile payment ecosystem, the industry architecture is crucial as the ecosystem involves actors from different industries such as telecommunications, banking and retail. Industry architecture delineates how roles, relationships and activities are divided among the participants and how value is created and appropriated (Tee & Gawer, 2009). An important aspect of the business environment in the context of mobile payments is the structure and development of financial, telecommunication and information and ICT infrastructures and markets (Dahlberg et al., 2008).

Although some research acknowledges the interplay between firms and their environment as a source of innovation capabilities (Cohen & Levinthal, 1990; Schumpeter, 1942), traditional innovation can address the inspirational needs and desires of affluent consumers for complex and expensive products. However, in developing economies that implies ignoring a large proportion of the population. The technology developed by the company Square provides a good example (Ondrus & Lyytinen, 2011). This technology works only with smartphones. In a country like India where most people do not own a smartphone (out of India's 900 million mobile users only 40 million have smartphones (Firstpost, 2013)) this technology ignores most mobile users. Since reaching a critical mass of consumers is essential for ICT to scale, mobile money solutions need to reach all these potential customers. Thus there are cultural elements that are relevant in addressing the research question.

Scholars studying innovation in ICT have highlighted the national, cultural and social factors that impact on ICT innovation (Avgerou, 2003; Heavin, Fitzgerald, & Trauth, 2003). Although culture is an important dimension in understanding ICT development, it is temporal

and emergent (Westrup, Al Jaghoub, El Sayed, & Liu, 2003). This suggests that a universal approach to study ICT innovation might hinder understanding. In the context of mobile payments, cultural and social factors are particularly relevant. For example, Cuendet, Medhi, Bali, & Cutrell (2013) argue that developing regions exhibit variability in spoken languages and users often have low levels of literacy, with little experience interacting with sophisticated technologies. ICT service providers need to deal with such issues.

In the case study I explore a particular context-specific practice, referred to as 'Jugaad'. This is a Hindi word that can be interpreted as *"the gutsy art of spotting opportunities in the most adverse circumstances and resourcefully improvising effective solutions using simple means and limited resources"* (Radjou, Prabhu, & Ahuja, 2012, Pg. 5). Although, as implied by the definition, bricolage is an important component of Jugaad innovation, it is not just limited to recombining existing resources. Jugaad innovation has the particular characteristic of serving the BoP consumer. It aims to result in cheaper products that retain core functionality.

Radjou et al. (2012) identify five key principles of Jugaad innovation. They are as follows:

a) **Seek opportunity in adversity:** Jugaad innovation perceives harsh and stringent constraints as an opportunity to innovate.
b) **Do more with less:** This principle implies being resourceful, using limited and leveraging existing resources. It also implies delivering better value than other more expensive services.
c) **Think and act flexibly:** This implies being flexible to changes in the business environment, transforming existing products and business models and continually introducing innovations.

d) **Keep it simple***:* This focuses on creating products that are simple to use and maintain, and to lower adoption barriers. In addition, the objective is not to achieve perfection or sophistication but to develop 'good enough' products that are easy to use.

e) **Include the marginalised:** Lastly, and perhaps most importantly, Jugaad innovation involves the marginalised communities such as those at the BoP who are denied access to different markets. Thus, it is about including the underserved and unserved communities.

In addition, Jugaad is considered as deeply rooted in India's cultural and vocational environment as it focuses on finding alternatives amidst a corrupt and inefficient state, one with bureaucracy and institutional voids, and widespread poverty (Rangaswamy & Densmore, 2013). Jugaad innovation is aimed at developing affordable and usable products requiring low investment and catering to a market ignored by conventional economic market forces. Furthermore, Jugaad entails reconfiguring materiality as it deals with resource constraints and scarcity. Existing resources will be reconfigured and new meanings will be created (Sekhsaria, 2013).

Radjou et al. (2012) identify certain key aspects of Jugaad innovation. Jugaad innovators aim to provide quick, better and lower cost solutions. They are highly adaptable and inclusive. Jugaad innovation involves collaborating with customers to identify product features and recombining existing resources (bricolage). In addition, Jugaad innovation entails responding to rapid changes in the environment and serving the BoP consumer in particular. Such innovation requires a quick and action-oriented response to the environment, in situations where planning ahead is not always feasible.

Characteristics	Improvisation	Bricolage	Jugaad Innovation
Definition	The deliberate and substantive fusion of the design and execution of a novel production (Miner et al., 2001)	Making do by applying combinations of the resources at hand to new problems and opportunities (Baker & Nelson, 2005)	The gutsy art of spotting opportunities in the most adverse circumstances and resourcefully improvising effective solutions using simple means and limited resources (Radjou et al., 2012)
Scope of Resources	Not limited to resources at hand	Limited to resources at hand	Uses limited resources and leverages existing resources
Temporal Convergence	No temporal gap between the design and execution of activities and they converge in time. Thus, improvisation takes place in unplanned conditions.	Bricolage can occur in planned circumstances as well	There is a bias for action and flexibility in action. Thus, Jugaad innovations do not plan ahead and confront situation as they appear
Material Convergence	Requires material convergence implies the design and executive should take place in same manner	Material convergence might or might not be present as it involves reuse of existing resources for different purposes	Material convergence is absent rather there is material reconfiguration such as giving new meaning to old objects.
Creating Innovation	All three concepts can result in creation of innovative products.		
Focus on products and consumer	The product features and the consumer set are not defined	Bricolage may sometimes lead to low quality products	Jugaad Innovators keep the products simple and provide better value to the consumers. In addition, the focus of Jugaad innovation is to include the marginalized such as the poor communities and tend to see them as an opportunity.
Environmental conditions	May or may not be restricted to resource constrained environments	Generally employed in resource constrained environments.	Strictly employed in resource constrained and resource denial environments and need to deal with adverse circumstances such as poor infrastructure and stringent regulations.

Table 7: Improvisation, bricolage and Jugaad innovation (adapted from Miner et al., 2001 and Gong et al., 2006)

In Table 7, I clarify the commonalities and points of departure between the concepts of bricolage and improvisation and that of Jugaad innovation. I therefore add to the scheme proposed by Miner et al. (2001) and Gong et al. (2006) by the additional discussion of Jugaad innovation.

In this paper I also address scaling in Indian context. Bricolage may assist social entrepreneurs develop new capabilities and ease the resource constraints and even see them as an opportunity to scale (Di Domenico et al., 2010; Owusu et al., 2013; Phillips & Tracey, 2007). However, Baker & Nelson (2005) contend that although ventures using bricolage are able to create thriving small businesses, these ventures are limited in their growth potential. Bricolage is considered effective at creating 'something from nothing' in very challenging environments, but it may prevent a venture from scaling, for example, into new geographic markets or user bases (Desa, 2008).

Jugaad, on the other hand, can facilitate ventures achieving scale. By adopting an action-oriented approach and dealing with existing and limited resources, Jugaad innovators can provide better value to consumers across different markets and thus can add them into the network. Although, Jugaad focuses on leveraging existing and limited resources, it thrives on the principle of 'doing more with less'.

In addition, Jugaad innovators focus on collaboration with different stakeholders including customers and thereby reduce the adoption barriers and increase the potential for scaling. Furthermore, Jugaad relies on a flexible approach by adapting to constraints and changes in the business environment. Therefore, by collaborating with stakeholders, by adapting flexibly, by providing simple solutions and by leveraging limited resources, Jugaad can

enable ventures to enrol different and greater numbers of actors into the network, provide better value to each of them and thus achieve scalability in challenging environments.

In section 3, I present the research context of this case study and the methodology, while in section 4 I show how scalability was achieved with Jugaad innovation by this company.

3. Research context and methodology

India is an appropriate research setting for this study. It is an infrastructure-constrained country implying that the financial and technical infrastructure is inadequate and it is also strongly governed by the financial regulator (Knowledge@Wharton, 2013). Although countries such as Kenya have proved to be an exemplar for successful mobile payment solutions, a similar success story has not been repeated by the same mobile operator (Vodafone) in a country such as India. Further, the telecommunications industry structure and the socio-cultural traits are different among developing countries and impact the organization of the mobile money market (Dahlberg et al., 2008).

I provide some specifics to illustrate the differences between this context and that of M-Pesa. While Safaricom, the MNO of M-Pesa, had a dominant role in terms of a large market share (around 80%) (Mas & Radcliffe, 2010), in India there are 10 major MNOs (Gupta & Tahilyani, 2013) making interoperability a major issue in deploying mobile money solutions. Furthermore, the cultural environment of India poses challenges such as the presence of multiple regional languages, low literacy rates and a high proportion of unbanked population. India has 18 official languages and two-thirds of the population in India is illiterate (Goyal et al., 2012). In addition, of a population of 1.2 billion, only 250 million have a bank account (Gupta, 2013).

In addition to the market structure and socio-cultural conditions, the regulatory issues inhibit the diffusion of mobile payments. Specifically, regulatory constraints impact the mobile money providers' freedom in designing the business model, service proposition and distribution channels (Heyer & Mas, 2009). Unlike countries such as Kenya, India is strongly governed by the financial regulator (the Reserve Bank of India (RBI)). For example, in India, mobile money solutions require the participation of a bank to enable cash withdrawals (a requirement of the RBI) and thus the providers have to partner with banks to overcome this constraint (Gupta & Tahilyani, 2013). Despite these constraints, some start-ups have been able to launch mobile payment solutions. However, dealing with these constraints implies that the independent players have to first put a mobile banking infrastructure in place and then provide for mobile payment solutions.

The case study company chosen concerns Alpha India Financial Services (referred to as 'Alpha'). Alpha is an India-based start-up launched by two partners with 0.5 million dollars donated by family and friends in 2007. Alpha is now a growing mobile money network of 3 million customers, 3000 agents, 3 micro financial institutions (MFIs) and 4 banks that cover banking, payment and money transfer services. They have processed over 30 million transactions valued over US$ 1.2 billion in the period 2007 to 2013 (Alpha, 2014).

In order to analyse the Alpha case, I principally adopted a qualitative approach based on primary and secondary data. Semi-structured interviews and field observations were the source of primary data. I interviewed actors within the mobile money network, that is, those involved in the scaling of Alpha. I also took advantage of the substantial secondary evidence available to examine the history and performance of this ICT innovation.

In terms of primary data, 40 interviews were undertaken from July 2013 to May 2014 with a number of actors directly related to Alpha. These consisted of top management executives (4), operational employees (10), agents (14), independent consultants associated with the project roll out (4) and other system actors including representatives from MFIs, banks and competitors (3) and consumers (5). I signed a confidentiality agreement with the company and thus I use fictitious names for the respondents in the interview citations made in the next section.

The interviews were conducted face-to-face from July to September 2013 and in December 2013. Further interviews were conducted over Skype from January 2014 to May 2014. Each interview lasted around 40 to 45 minutes. The confidentiality agreement prevented taped recordings of the interviews. I took extensive notes and transcribed them within 24 hours of the interview.

I also spent two weeks at the sites of ten agents observing the pattern of interactions. At each agent's site I observed the manner in which consumers carried out the transactions, the purpose of the transactions and the kind of consumers that frequented the site most. Following this, I identified consumers that were willing to participate in the interview process, and agents and consumers were then interviewed.

The focus for the interviews was to understand the challenges and problems faced and the operations of Alpha that underpinned scaling, and in particular to understand the roles of institutions and the different actors in the innovation and scaling process. Given that the primary consumer base for this ICT innovation consisted of poor people, I interviewed and observed stakeholders operating in both rural and urban areas.

Given the longitudinal perspective required when studying the process of scaling ICT-based innovation, I found the secondary documentation that is available on Alpha also relevant to the study. I have drawn on reports and publicly-available statistics amongst other material. To give an example, I gained useful insights about the field through the reports published by two organizations: The Consultative Group to Assist the Poor (Flaming, McKay, & Pickens, 2011) and MicroSave (Laureti & Matthews, 2009).

Both primary and secondary data are used in the account of scaling and innovation that follows. Based on the data, I categorize the key challenges and constraints that inhibited and facilitated the scaling process. In addition, the strategies adopted by Alpha to deal with the challenges and constraints are also discussed. I identified the new processes, roles and business models that were created during the scaling process over time. I discuss these key findings from the case in the next section.

4. Findings from case analysis

In this section, I discuss the hazardous path, from 2007 to 2013 that eventually led Alpha to become a well-recognized player in the scaling of ICT for BoP consumers. First, I provide details about the mobile payment process designed by Alpha. Following this, I present an overall timeline to demonstrate the scaling of Alpha ICT services over time and then present the findings of the case study.

Alpha provides a low cost financial services infrastructure to extend the reach of financial institutions to the unbanked in urban and rural areas in India. The company targets customers such as housemaids, auto rickshaw pullers and vegetable vendors who have low income levels and do not have access to the banking system. The consumers can deposit, withdraw or

remit money by simply composing and dialling a sequence of numbers on their mobile phone. There is no need to compose messages thereby taking into account the problem of illiteracy and the presence of multiple languages in India. Furthermore, the dialling of this sequence of numbers is treated as a 'missed call' so that the consumer is not charged for the call. In addition, the mobile number serves as the bank account number of users in this business model so that it can be recalled easily.

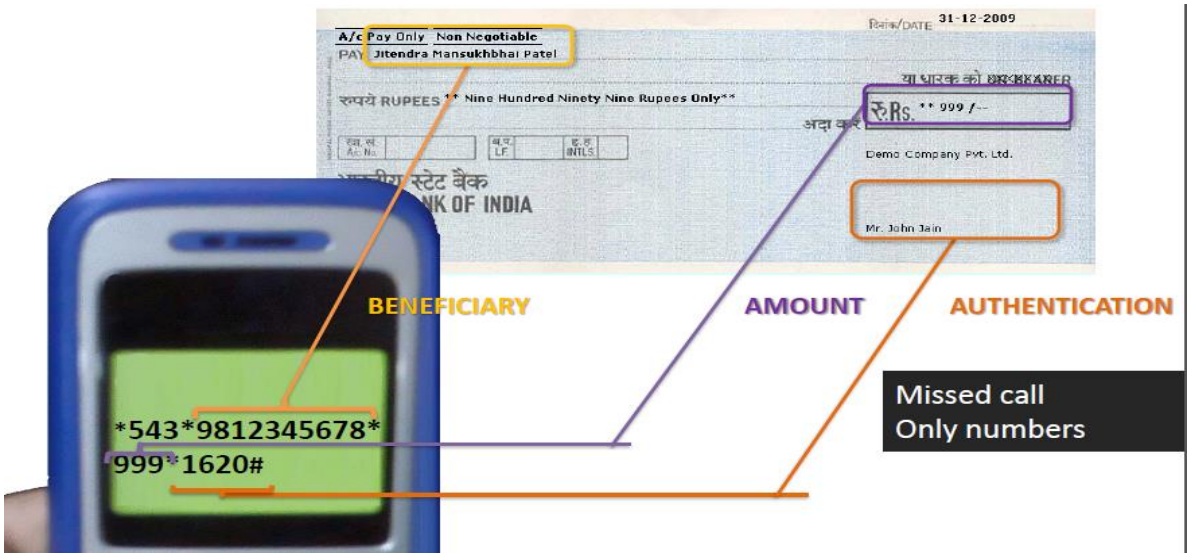

Figure 14: Mobile payment with Alpha

In Figure 14, I show a person-to-person (P2P) payment being made to another user through the mobile phone. The sender dials the following string from the mobile phone: *543* signifies that the transaction belongs to Alpha; *9812345678* is the user's account number or the mobile number; *999* is the transaction amount and *1620* is the one-time password number. The sender then presses the call button and there is no charge for the call.

The timeline in Figure 15 suggests the level of scaling achieved each year. I also show how new actors entered the mobile money network and existing ones left. We show how Alpha diversified its portfolio of products, services and partnership over the seven-year period. I do this in the context of nine key factors that expedited and inhibited the scaling of this ICT

innovation. Further, I discuss how Jugaad innovation played a crucial role in dealing with these factors.

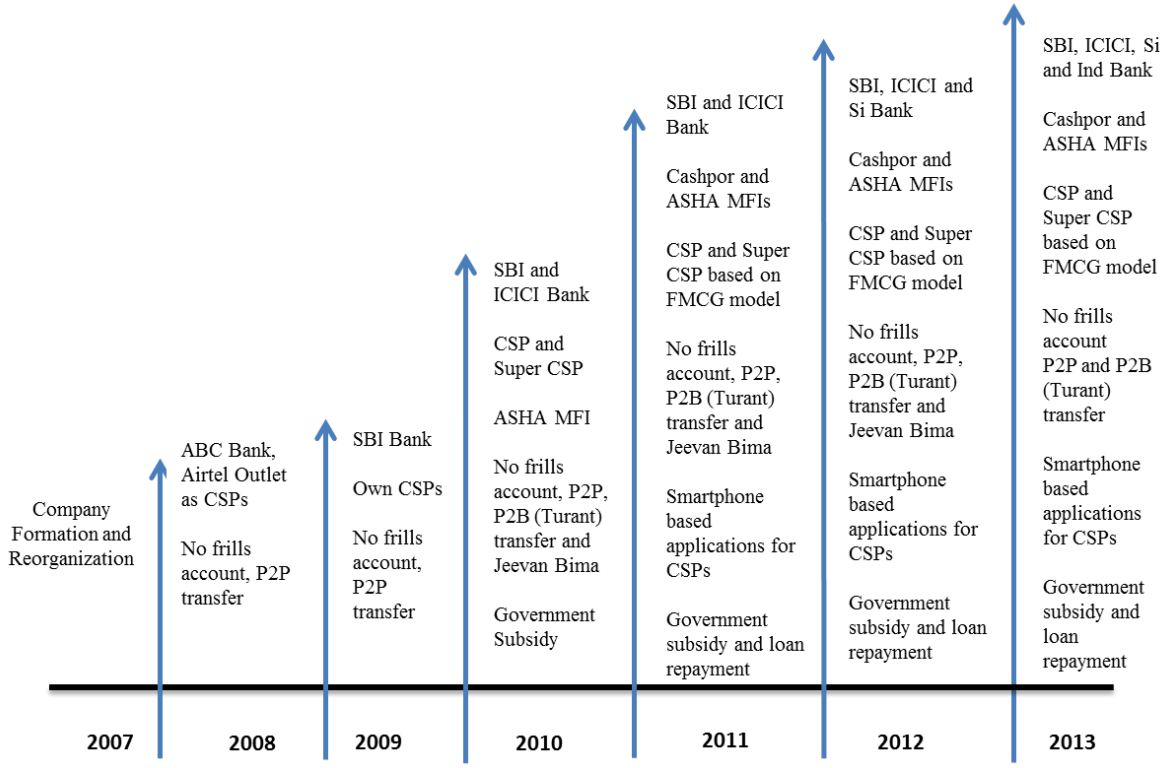

Figure 15: Timeline of Alpha progress

4.1. Company organization and reorganization

In 2006, the regulator (RBI) issued the business correspondent (BC) model directive which enabled organizations to offer ICT-based innovative products. However, there were several limitations that forced Alpha, once set up, to restructure almost immediately to be able to participate in mobile money activities. For example, the RBI required that only banks can appoint BCs and only non-profit organizations (NPOs), retail shops, and individuals can be agents. Thus, Alpha had to set up a non-profit arm in order to earn the right to offer mobile money solutions. However, this in turn created hurdles for Alpha to obtain additional

funding. As Alpha is an entrepreneurial start-up, it relies on funding and grants from venture capitalists and funding associations. As Manavsi, VP, international business explains:

Initially…when we started, the environment was too restrictive. The constraints have slowed down the pace of progress. Venture capitalists do not give funding to NPOs. It has been a problem to obtain additional funding.

As the RBI focus is on financial inclusion, people at the BoP, for example the migrant workers in Delhi, represent a major target consumer base. The RBI required that BCs do not charge customers a fee for transactions. Many of the BCs were reimbursed by the banks for the transactions that consumers made as this was seen more as a corporate social responsibility activity than as a viable line of business. As Digvijay, an independent consultant in M-Banking who works closely with Alpha argues:

Banks earlier thought of the account opening activities as a mere corporate social responsibility activity. They do not even consider the BoP consumers as a viable consumer base...more as a liability.

Thus the regulatory framework that is characterized by restrictions and constraints for designing the business model has prevented active participation of banks and negatively affected the commercial viability and sustainability of the BC models. Entrepreneurial ventures such as Alpha have to deal with stringent regulations and have to go through several bureaucratic processes. Jugaad implies seeking opportunities among hurdles and responding flexibly and as they appear to such regulation. Alpha represents a good example of this as it took the directive of BC model as an opportunity to provide a low cost mobile banking infrastructure. In addition, it restructured its organization promptly, setting up a non-profit arm able to function as a BC.

4.2. Failed partnerships

In 2008, Alpha entered into a partnership with ABC Bank to open no-frills accounts (Gupta & Tahilyani, 2013). This fell through after the latter merged with Pegasus Bank, and Alpha found itself in difficulty. Alpha had to close down all the accounts it had opened for the bank. A lot of funds had gone into offering this service and the failure drained much of its funds.

Another partnership that failed was that with Airtel, an MNO for unstructured supplementary service data connectivity. Alpha leveraged Airtel's network of 1.2 million outlets (Flaming, McKay, & Pickens, 2011), trained the MNO staff and provided the back-end technology and support. The partnership failed for two main reasons[6]. First, Airtel outlets received a higher commission for its connection and airtime-selling business than Alpha provided, so agents had less incentive to promote the Alpha-ABC product. Second, Airtel as an MNO was not legally allowed to issue a mobile wallet or put their branding on a financial product. Therefore, the agents did not have a sense of ownership of the product. As a result, Alpha set up its own network of agents.

These two examples of failed partnerships indicate that Jugaad innovation is action oriented and planning ahead in time is not feasible. Rather, Jugaad innovation implies proposing prompt solutions and actions as difficulties arise. For example, the failed partnership with Airtel agents enforced Alpha to rethink its distribution model. Thus instead of outsourcing the agent network to Airtel, Alpha decided to set up its own agent distribution network.

[6] The information was provided by the informants directly

4.3. Successful partnerships

After experiencing difficulties for the initial one and a half years, the State Bank of India (SBI), the largest state-owned banking and financial services company in India, appointed Alpha as its official BC in 2009. Alpha initiated operations with the launch of the 'SBI Mini Savings Bank Account' at Uttam Nagar, New Delhi (Laureti & Matthews, 2009). These enabled account holders to carry out financial transactions such as deposits and withdrawals from their accounts using their mobile phones at neighbourhood local grocery stores (*kiranas*), stationery stores, petrol pumps and pharmaceutical shops. A BC is essentially an intermediary between the banks and the end users and provides banking and financial services to consumers. As a BC, Alpha opened no frills accounts for the consumers with the SBI. As Alpha did not have an established distribution network, it leveraged the already established network of neighbourhood grocery stores, stationary shops and chemists as its customer service points (CSPs). The BC model is depicted in figure 16.

As Alpha was a new entity it lacked consumer trust in the market. In addition, as the product was new, the consumers had little trust in the product itself. As discussed above, this is in complete contrast with the case of M-Pesa. Therefore, to scale up the business it was important for Alpha to acquire new customers. It did so through the use of CSPs. In order to acquire customers, Alpha collaborated with local grocers and pharmacies. These are the most trusted in any given locality as the consumers visit them on a daily basis for purchasing food, medicines and airtime cards. In addition, they are open for long hours whereas banks are functional for only a few hours each day.

The local pharmacist (CSP) is the local doctor. These people do not go to a doctor when they are ill; they go to these shops to buy medicines (Dhiraj, VP Product).

Shyamji bhai shop (a local grocer) is just a few steps away from where I sell flowers and it is my bank (Phoolwati, street florist).

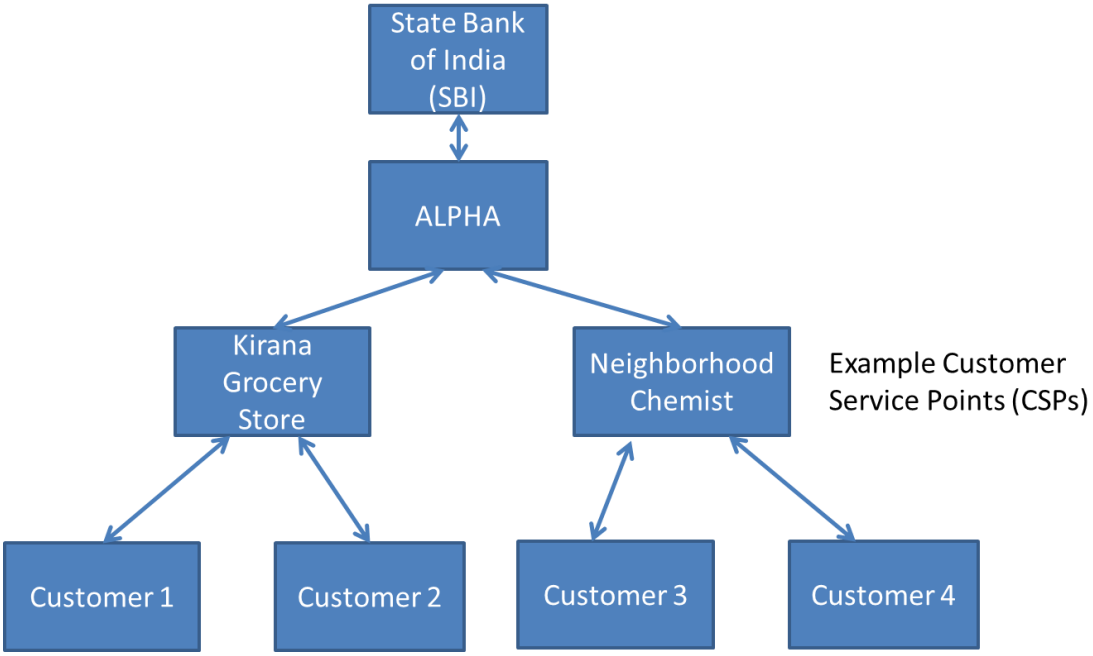

Figure 16: A representation of the business correspondent model

Partnering with these kiranas has helped us achieve scale as they have their own consumer base. Kiranas promote our products to the consumers, inform them…teach them how to do transactions and are the most trusted people in the locality (Manavsi, VP, international business).

Although the partnership is running smooth with Alpha acquiring 220 million accounts and is currently well established, several issues have surfaced over the last few years. For SBI, the partnership with Alpha enabled it to expand its footprint and its customer base. However, SBI considered the partnership more as a means to comply with the RBI's financial inclusion goals, rather than a mutually beneficial business alliance. In addition, SBI, being a government organization, has insisted on certain requirements being fulfilled:

We have elections next year…banks have to fulfil their financial inclusion targets….They do not want to get involved in the hassles and so they ask us to open accounts for consumers in the villages that are still unbanked (Manavsi, VP, international business).

In addition, the economics related to the structure of margins was not favourable to Alpha. When the partnership started, SBI paid Alpha 10 rupees for every account sourced, whereas Alpha paid 30 rupees to its CSP. This higher commission by Alpha was to incentivize the CSPs to promote the product to clients. As one CSP owner argues:

In any other business you have to acquire consumers, but in this business the customer comes to us to buy bread and butter….I tell them about the Alpha product, teach the consumers how to do their transactions…. and they like it….They can come any time in my shop …and do deposits and withdrawals in small amounts… (Ashish, owner of a general kirana store).

In addition, all the operational activities (for example, identification and training of agents, monitoring and fraud prevention, quality control and customer service) and marketing costs (for example, promotion, financial education and a call centre) were borne by Alpha. SBI did not cover such costs. This has had a significant impact on Alpha's scalability in terms of profitability and generating revenue streams. Therefore, the no frills account opening proposition initially did not come as a profit making one for Alpha.

Initially we invested a lot in building our customer base both in rural areas such as Bihar and Jharkhand and in urban areas such as Delhi. We had to establish agents in both rural and urban areas (Alok, business development manager).

Additionally, consumers were using the Alpha platform mainly to deposit or withdraw money. Money transfers were very few in number.

We did pursue with setting up CSPs at both receiving and sending end at the start. But, setting up both the ends of the remittance pipeline was a huge exercise. We realized that doing this requires a significantly large base of agents on the sending and receiving side, greater efforts to educate people on both sides and significantly deep pockets to be able to pull this off (Girish, assistant sales manager).

In addition, as inter-organizational collaboration is essential for the ICT innovation to take effect, banks also needed to have the same sense of responsibility towards building the mobile money network. However, this did not come easy:

Banks have been very slow to innovate and design new products that suit the needs of the BoP consumers (Nitin, independent consultant, m-banking).

Further, the banks took a long time, almost three years, to integrate the no frills accounts sourced through Alpha into its core banking system. This implies that an Alpha consumer was disconnected from the existing consumer base of the bank at that time and could not transact with these consumers. In addition, they can only go and transact at Alpha CSPs.

All the regulations that have been in place from 2007 until today have slowly and steadily increased …. There has been slow progress allowing technology to catch up with the regulations in place… restricting us from innovating faster. For example, I have an account outsourced through the bank i.e., SBI and my maid has acquired an account through us i.e., Alpha. I cannot pay her on my mobile…I need to take out cash and pay her in cash…Thus, there was an 'island' of consumers who could not use the existing banking infrastructure…. (Manavsi, VP international business).

An engagement in Jugaad innovation denotes material reconfiguration i.e., working with limited resources and creating new purposes for these resources. For example, lack of access to a formal banking infrastructure enabled Alpha to tie up with kirana stores as CSPs. In the business model provided by Alpha, these local grocery stores enact the role of human automated teller. Furthermore, they carry out some of the functions of a bank. For example, many of the CSPs perform the consumer inquiries and investigation functions as they already know the consumers. Jugaad also entails resourcefulness and doing more with fewer resources. As argued earlier, the CSPs perform many different activities such as training the customers and promoting the product. Thus, Alpha CSPs act as a banker, human teller, trainer and promoter of Alpha products. This in turn provides better value to consumers as the CSP is the local banker as well as the local grocer. In addition, the CSPs operate from early morning until late night thereby making banking convenient and easy for consumers.

4.4. Product shift to remittance service

Owing to the economic challenge of the no frills accounts and the lack of bank support, Alpha launched an instant remittance product known as ‘Tatkal’ with SBI in August 2010. Tatkal is an instant money transfer service that allows customers to deposit cash into any SBI bank account. A no frills account (sourced by Alpha for SBI) is not required, and the recipient only needs to have a SBI account for Tatkal to work. The sender visits the CSP with the cash to be deposited.

The rationale behind launching this product was to extend the reach and include the already existing consumer base of SBI:

Many migrants in Delhi do not have a bank account but their family in the village has one. Only the recipient needs to have an account. Normally, in India small villages have this entity: the village head. Everyone deposits money into his account and then he distributes this money to the families of the migrants (Namit, business analyst).

The objective was to include the already existing consumers into our network. We increase the customer base and extend our reach to different geographic areas of India (Shalini, Area Sales Head).

Additionally, the banks were also supportive of this product as they have managed to decongest the bank branches by redirecting the BoP consumer to these CSPs. An executive of the bank comments:

We were afraid of losing rich customers because of congestion in the bank branches. Thus, we send the poor consumers to the Alpha CSPs (Manas, branch executive, SBI).

Many people come to my shop to send money…They are poor people who are often insulted in the branches…The banks do not want to deal with them as the transaction amount is low. They come to my shop and I treat them well as I do when they come to buy bread and butter. More and more customers come to my shop as the bank itself sends customers to my shop (Jitesh, a CSP who owns a kirana store).

This product has been a profitable stream of revenue for Alpha. As of September 2011, Alpha had processed transactions amounting to 8 billion rupees with 1.6 million transactions. However, certain restrictions still remain. For example, remittances sent over Alpha's platform are capped at 10,000 rupees per day and 25,000 rupees per month thereby enforcing a focus on lower-income users.

Jugaad requires flexibility by continually introducing new products and services. Furthermore, it tends to keep the products simple and easy to adopt. Alpha proved to be highly flexible while scaling up. As it realized it was challenging to set up a network of agents and customers at both sender and receiver end, Alpha introduced a person-to-bank (P2B) remittance scheme in addition to existing person-to-person remittances. Further, the product is mobile based and transactions are performed by the simple dialling of numbers and this reduces the adoption barriers.

4.5. Channel management issues

Alpha leverages existing kiranas as its distribution agents. Alpha CSPs do not need any capital investment to function as a CSP. However, CSPs generally pre-fund their bank accounts with the expected daily transaction value:

We ensure that CSPs do not have to make any additional investments in working with us. They do not need a Point of Sale terminal or get internet connectivity. All that our agents need is a small amount in their bank account (Anoop, area sales manager).

We ensure that they do not have to put aside a lot of funds. They need only put in a small sum but earn margins on rotating that money from one consumer to another in terms of deposits, withdrawals and remittances (Alok, business development manager).

The distribution and channel management task has also evolved over the years:

When we started to set up CSPs we were trying to enrol a lot of them. That did not always work. In some cases, the CSPs ran away with consumer cash. Then we realized we needed to enrol and train agents selectively and not on an ad hoc basis (Shalini, area sales head).

Alpha now follows strict procedures for selecting agents. Alpha enrols CSPs based on the location, business experience, financial stability (typically diversified with multiple sources of revenue), and their willingness and ability to complete forms and explain the product to users.

The whole CSP selection process was transformed…We got them to fill in the forms and each form was then evaluated. One key criterion for us is that the CSP should have at least 2 to 3 years of business experience in the locality (Manavsi, VP international business).

The subsequent step was training the CSPs. Alpha has been very active in training and assisting the CSPs in their daily work. Anoop, area sales manager further explains:

Here we also went through a number of iterations…We noticed that if we train the CSPs well in advance before they go live with the business…they tend to forget…Now we ensure that the CSPs go live within a day or two after we have trained them.

As the number of CSPs grew, Alpha started to scale up their business and it became a challenge for Alpha to constantly monitor and engage with the CSPs on a daily basis. Additionally, identifying suitable CSPs was a challenging task as it required significant investment in time and money. To deal with this Alpha decided to adopt the fast moving consumer good (FMCG) distribution model, wherein there is a wholesaler and that wholesaler has several retailers under his control:

The idea was that if they can sell Coca Cola through these outlets, let us try and sell financial services through this FMCG model as well (Digvijay, independent m-banking consultant).

Alpha followed a FMCG distribution model that is composed of wholesalers and retailers and wherein wholesalers distribute goods to retailers and extend credit as well (Dholakia et al.,

2012). In accordance with this model, Alpha introduced a new Super CSP role (equivalent to a wholesaler in FMCG model). Super CSPs typically have a large business base in a locality and work as distributer of goods to the several retailers there. For Alpha, the Super CSPs help to identify reliable CSPs (equivalent to retailer in FMCG model) and manage about 50 to 70 CSPs.

Super CSPs take care of the cash management activities such as providing CSPs with a working capital float, collecting extra cash from the CSPs in their locality and depositing in the bank. They also deal with promotional material and supervisory activities such as administering the day-to-day activities of the CSP. This additional role in the mobile money network streamlined the distribution channel for Alpha.

When I joined Alpha…I realized the product will have huge demand…In the last two years, the 50 retailers I had under me have joined Alpha as CSPs (Vivek, a Super CSP who owns a kirana store).

The economics associated with agents also proved to be a challenging task. Alpha ensured that the earnings through Alpha's business form a significant part of their revenue stream. Alpha passes approximately 55 percent of its income from remittance product to the CSPs. Although the margins on Alpha products are lower as compared to the margin on FMCG and pharmaceutical products, Alpha CSPs make money on rotating the money and doing a high volume of transactions. Although, the channel management issues have been sorted out there still exist some restrictions on the manner in which Alpha manages the CSPs and the Super CSPs. As Dhiraj, VP product explains:

Every time we enrol a new CSP we have to go the bank branch and ask for its permission. Sometimes, it ends up being a lengthy process.

It is just like the license Raj days. There are regulations around the number of agents a bank can appoint in a locality. From the point of view of distance…there should be a bank branch within a distance of 2 to 3 kilometres of an agent (Digvijay, an independent m-banking consultant).

Jugaad in channel management relates to the constant search for finding appropriate business models and compensation structure. Alpha shifted its focus from recruiting agents in large number to selecting agents cautiously and meticulously. Jugaad also involved process innovation in selecting the right agents and providing them training a few days before they start operations. In addition, it involved creation of new entities such as the Super CSPs to execute the administrative and cash management tasks.

4.6. Competition

One major challenge is competition. In India, a total of 95,767 BCs exist (Gupta & Tahilyani, 2013). Alpha faces stiff competition from BCs such as Oxigen and Suvidhaa. Competitors pay a higher margin to the agent and some CSPs have gone to them. Although Alpha enters into a formal contract with the Super CSPs and CSPs that prohibits the CSP to work as an agent for other CSPs, it gets difficult to retain them.

Yes, we have lost some agents to competition – over one hundred CSPs. We do control and there are certain regulations that prohibit an agent to be associated with multiple BCs. But there are always ways to get around regulations…Let's say an agent is associated with Alpha… Competitors A and B offer him a higher margin. So he makes his wife an agent for A and his son for B. And they all operate from the same shop (Manavsi, VP, international business).

Even though competition has intensified, Alpha still remains the preferred choice for many reasons. First, Alpha does not require CSPs to make a heavy upfront investment. Second, unlike its competitors who require agents to invest in point of sale terminals, computers and internet connectivity, Alpha enables its CSPs to work with minimum resources as the mobile money solution works with very basic mobile phones. This is crucial also in areas where there are electricity cuts for long hours. Third, Alpha ensures that the CSPs rotate the money frequently and do high volumes of transactions.

One key characteristic of Jugaad is working with limited resources and using existing resources instead of creating new ones. Particularly, in a highly competitive landscape, Alpha has managed to retain a large share of its CSPs because it makes use of basic mobile phones that are readily available and owned by all as opposed to other equipment such as computer, internet and sophisticated terminals.

4.7. Jugaad, bricolage and collaborating with MFIs

By 2011, Alpha was well established in Delhi and in urban areas. To scale throughout India and extend its reach to more remote areas in India, Alpha started evaluating options to enter more into rural areas. Alpha's core strategy has been to utilize bricolage as a way to leverage existing infrastructure, existing human resources and working with minimal investment. Building on Jugaad, Alpha entered into a three-way partnership with a MFI named Cashpor and with ICICI, a private sector bank, and started operating in rural areas such as Varanasi. ICICI bank provides for no frills accounts and deposit schemes such as fixed deposits. Cashpor clients, who are mainly poor women, use the Alpha service to access small loans and later repay them. Thus for Cashpor, Alpha works as a provider of mobile phone banking technology for clients resulting in enhanced convenience, along with reduced transactional

costs and cash handling costs. The credit disbursal and recollection are done through the Alpha platform and thus the loan officers do not have to handle the process manually. The partnership with Cashpor helped Alpha to scale. In India, MFIs are not allowed to mobilize deposits, therefore for Cashpor, such a partnership led to a transformation from a credit only MFI to an organization that provides a wide range of financial services (no frills accounts, cash withdrawal and deposits).

We do not have to acquire new consumers. Cashpor has already an established consumer base. We do not have to establish offices and enrol agents. Instead we operate from the Cashpor office and Cashpor has loan officers that work as CSPs providing savings and deposit services to loan consumers (Manavsi, VP international business).

For Alpha, this partnership is the largest deployment of its technology platform apart from its own BC based business, and therefore it has helped it to achieve scale (Pulkit, project manager at Cashpor).

4.8. Collaborating and competing with MNOs

Initial partnerships involving Alpha and Airtel did not materialize and consequently failed. However, as the Alpha solution is unstructured supplementary service data based (a protocol for cellular communication adopted by all MNOs), Alpha still works with Airtel to get access to the mobile network to process calls. As the Alpha product is based on this technology it has to partner with different MNOs, but not all have established themselves. This remains a challenge to Alpha. Initially, MNOs were not allowed to offer a mobile money solution. Later on the regulations were relaxed allowing MNOs to enter the mobile money market. Moving

further, MNOs are now working as BCs of banks. Thus, Alpha has to collaborate with Airtel to enable access to the mobile network, but it faces competition from Airtel in the BC space.

It has been a challenging task collaborating with MNOs. For MNOs it is a conflict of interest. Why would they want to partner with a competitor? As we have to partner with multiple MNOs some of them do not give us access to the network and others bully us by charging high prices (Manavsi, VP international business).

Alpha still uses simple dialling mechanisms to carry out the transactions, but it has also created Android based apps that are compatible with most smartphones. This development is not for the use of BoP customers but to enable CSPs and super CSPs to use a more advanced technology.

4.9. Expansion and further regulations

Alpha has now partnered with three other banks. They are ICICI Bank, Si Bank and Ind Bank. Alpha has piloted expanding the range of financial products it currently offers. For example, Alpha partnered with the ANA life insurance company and it provides ANA Life – Jeevan Bima, an insurance product. Alpha collects information regarding consumer transaction patterns, such as average transaction size and frequency, from its CSPs. Based on the data, ANA decides on the life cover for consumers. ANA leverages Alpha's platform to collect the insurance premium and to grant life cover for micro insurance products.

In addition, Alpha is working closely with state governments in areas such as subsidy disbursal and government grants. Alpha has recently been awarded a project by the Government of Bihar where it enables timely and end-to-end disbursal of health benefit

allowances to accredited social health activist (ASHA) workers employed under the National Rural Health Mission in the Pipalpura district of Bihar.

Although Alpha is expanding its current basket of products, new regulatory issues have surfaced. Since Alpha deals with actors (MNOs, banks, insurance and microfinance companies) from different industries such as telecommunications, insurance and banking, its product offering is contingent upon the regulatory concerns of such industries. For example, the pilot involving the product ANA Life could not reach enough consumers and the product was discontinued also because of regulatory concerns of the insurance regulator.

As demonstrated in sections 4.7, 4.8 and 4.9 (of this appendix), Jugaad enabled Alpha to deal and respond flexibly to regulatory restriction and develop innovations in products and business models to scale up. For example, although Alpha works as a BC for banks, it has partnered with MFIs to provide new products such as loan repayment products through mobile and government grant disbursals.

As MFIs are not allowed to procure deposits, Alpha in collaboration with banks provided the platform to offer savings and deposit services to BoP consumers. In addition, Alpha focuses on including the marginalized, especially poor women and other consumers at the BoP.

Based on the analysis of nine factors that impact the scaling process adversely and favourably, I summarize the key factors that inhibit or facilitate the scaling process through the case findings in Table 8.

Factors that inhibit/facilitate the scaling process	Impact on scaling	Steps taken by Alpha to deal
Regulation	*Inhibitor:* Alpha operates in an ecosystem that involves partners from different industries. Thus, it has to address the regulatory constraints of multiple industries such as banking, telecommunication and insurance. Regulation is a factor that has inhibited Alpha from scaling at a fast pace	It is in constant touch with representatives from banks to better address the regulations in terms of designing suitable products
Competition	*Inhibitor:* Alpha has lost some of its CSPs to competition. As competition intensifies it will prove difficult to retain them as competitors are hiring. Cleary acts as an inhibitor	Alpha adopted a bricolage strategy as it enables CSPs to work with minimal investment and a basic mobile handset. It also closely monitors day to day working of CSPs to develop better relations with CSPs. Thus many CSPs prefer Alpha because they can start operations with no investment in infrastructure
Bricolage	*Facilitator:* Alpha leverages existing consumer base of CSPs, existing distribution networks of MFIs, existing telecommunication and retail infrastructure	Alpha continues to enact bricolage strategy as it helps it to scale up by acquiring new customers and expanding to different geographical markets such as rural areas
Collective agency	Facilitator: Entering into inter-organizational partnerships with different institutions in rural and urban areas such as MFIs, banks and regional governments	Alpha continues to design new products such as micro insurance in collaboration with other actors. However, the success of such initiatives lies on obtaining the regulatory approval
Channel management	*Inhibitor during early days:* During the initial phases, managing CSPs were a problem due to issues such a fraud and dormancy of agents. Progressively, Alpha has resolved these issues by introducing the new role of Super CSPs	Alpha adopts stringent procedures to enrol CSPs in the mobile money network. In addition, the Super CSPs also assist Alpha in selecting CSPs
Product and process Innovations	*Facilitator:* The scaling process is composed of several product and process innovations such as NFAs, P2P remittances and P2B	Innovation in products and processes is a key strength for Alpha. Alpha had new processes for consumer interactions and CSP

	remittances. Process innovations involved the way alpha dealt with its agents. For example, if a CSP has high volume of cash then Super CSP collects the extra cash. Additionally, the KYC, AML procedures are now done by CSPs and not by banks	management
Partnerships	*Facilitator:* Alpha has been a part of successful and unsuccessful partnerships. In the initial phases the partnerships did not materialize but in the later stages there were successful partnerships as Alpha now partners with three banks, MFIs and regional governments	Alpha has focused on creating value for all of its partners. For example, as a partner of ICICI bank it engages in opening NFAs but as a partner with SI bank it only provides access to its technological platform.

Table 8: Inhibitors and facilitators of the scaling process

5. Discussion

The paper focuses on understanding how ICT innovations deployed at the BoP achieve scale. Scalability is a key problem in the context of developing countries and it relates to increasing the access, the variety and significance of services offered over time to a larger population and in different geographies (Walsham, Robey, & Sahay, 2007). Drawing on perspectives from resource bricolage and Jugaad innovation, I illustrate this by researching how Alpha leveraged existing resources such as the omnipresent mobile telephony, the potential of 50 million informal local kirana stores, and the existing relationships between the kiranas and consumers.

I also identify the factors that impede and promote the scaling process. One key constraint that impeded this was the presence of regulatory constraints and the slow progress and lack of willingness to design suitable BoP products by the banks. The factors that promoted the scaling process were effective partnerships with actors such as kiranas, MFIs and banks.

Multiple actors were involved in shaping the ICT innovation, a phenomenon called co-invention in the BoP literature (London & Hart, 2004). In contrast to the findings of Foster & Heeks (2013) that co-invention in the case of M-Pesa occurred only for a short period of time, co-invention in the case was progressive, long run and participatory.

Unanticipated uses of ICT appeared in this context too. For example, consumers frequently checked their account balances and this increased the cost for Alpha (as Alpha, not the consumers, is charged for this). Such phenomena also occurred in the case of M-Pesa. However, in that case, Safaricom, the lead operator, responded to such events by increasing the cost of balance checks (Mas & Morawczynski, 2009). This is not an approach suitable to BoP customers, so Alpha engaged with its CSPs to address this concern. The CSPs encouraged the users to check their balance on a timely basis for example, once at night and once in the morning, but not more often.

During the scaling process, Alpha acted flexibly by introducing innovations in processes, products and business models, a key characteristic of Jugaad. This was particularly crucial in selecting the right partners and dealing with channel management issues. As Alpha was scaling and enrolling new agents, some existing ones left the mobile money network. This was true of the CSPs as Alpha left some of its CSPs to competition. In the initial period, some of the CSPs who were enrolled became inactive as they lost interest or were unable to manage an alternate stream of business. The same was true for consumers, especially in the initial days when no frills accounts were sourced. Some of the consumer accounts became dormant.

Competition is also a crucial concern for Alpha as it scaled up its business. However, what worked for Alpha has been its strategy for minimal investment and high rotation of money (in

terms of daily transactions). Alpha ensures that all its CSPs work with minimum funds investment and with no additional investment in infrastructure such as point of sale terminals, computers and internet connectivity. Such a course of action has given Alpha a significant competitive advantage.

The overall scaling process was composed of several product and process innovations. Alpha initially started with providing no frills accounts. It progressed to provide person-to-person remittances and then person-to-bank remittances. In addition, local innovations in processes were created by the CSPs as they took charge of processes such as consumer inquiries (as discussed in section 4.3 of this appendix). For example, the agents used to spend at least 5 to 10 minutes with the consumer asking for the reason for transferring money and the source of his income. In addition, the CSPs started handling manual receipts to the consumers in case the message confirming the remittance was delayed. Another key argument relates to the material reconfiguration, a key principle of Jugaad innovation. Existing resources were given new meanings and used for different purposes. As demonstrated in sections 4.3 and 4.4, the CSPs enacted the role of human tellers and the omnipresent informal kiranas became local bank branches. In addition, the basic mobile phone became the financial identity of the consumers.

Furthermore, the role of collective bricolage, i.e., collective agency and participation of the external actors, was crucial for Alpha to achieve scale. Zahra et al (2009) argue that reliance on readily available resources prevents organizations from scaling their operations or expanding geographically. However, my findings differ as they demonstrate that by leveraging existing resources such as the user base of MFIs and kiranas, loan officers' network of MFIs, and the established social interaction between consumers and kiranas can move to different geographies and scale their set of operations. This study also lends support

to the role of collective agency in scaling i.e., the participation of different actors strengthens the relationship between bricolage and market scalability. The Alpha case demonstrates that in the context of scaling ICT innovation, collective bricolage (Duymedjian & Rüling, 2010; Halme et al., 2012), that implies collaboration and participation of external actors, is required to scale the venture into new markets and user bases (Desa, 2008).

In, addition, I demonstrate that under circumstances of intense competition, Jugaad innovation helps them to scale and imparts a competitive advantage to firms. For example, Alpha remains a preferred choice because of the requirement for minimum investment in funds and infrastructure.

This study also lends support to the argument that ICT innovations at the BoP reduce market separations (Tarafdar, Anekal, & Singh, 2013). For example, Alpha, by partnering with banks and MFIs in rural areas, not only reduces financial separation (providing loans, saving accounts and deposits) it also reduced temporal separation (timely exchange of products and services between consumers and producers). For example, the poor women at Cashpor can now withdraw and deposit money in their villages anytime.

Avgerou (2008) argues that there is a need for theoretical understanding of particular courses of action that attempt to achieve socioeconomic improvements through introducing ICT. This study indicates that by engaging with local actors at the grassroots level (for example, consumers, MFIs and kiranas), development outcomes can accrue for consumers. Such engagement not only creates appropriate value for the consumers (ability to save for future needs, achieve financial freedom, and gain access to small loans) but also for all the other actors (increased revenue and higher visibility of their own business). My study also emphasizes the increasingly important role of government and the institutional context. Alpha

had to make multiple adaptations to its product line because of the stringent and frequently changing regulations around mobile money.

Finally, it is argued that there is little understanding about how social entrepreneurial ventures scale the impact (Desa & Koch, 2014). I demonstrate that by engaging with local communities such as MFIs and local kiranas, Alpha achieved depth (different services such as loans, subsidy and deposits in a single geography) and breadth impact (same set of services such as no frills accounts and remittances across different geographies).

6. Conclusion

In this paper I have described the scaling of an ICT innovation at the BoP. The scaling occurred on the technological dimension (from unstructured supplementary service data to Android-based applications), on the geographical dimension (from urban to rural and poor communities) and the institutional dimension (inclusion of new entities, organizations, products and processes). This paper enhances the understanding in the domains of scaling of ICT innovations. I highlight those elements that facilitate and impede the scaling process. Political support is a key driver of scaling (Sahay et al., 2013) but regulations and constraints can also prolong the scaling process.

Scaling in the presence of constraints and in a competitive environment remains an understudied phenomenon. Though the much celebrated success story of M-Pesa is well cited, we do not know what the outcome would have been if Safaricom had to compete with 10 other MNOs. Thus, my study provides evidence of how the scaling process is impacted in constrained and competitive environments. Competition makes it difficult for the innovator to retain its network of actors. The lead firm needs to continuously create better value for each

of its partners. Jugaad proves to be a good means to deal with these situations as working collectively with a flexible approach and with limited and existing resources, ICT innovation can achieve scale.

This study has some limitations. First, I was not able to interview the regulator and thus some factors were left undiscussed. For example, the compulsory inclusion of banks into the system remains unexplored. Second, the case represents a successful scale case where obstacles and challenges abound. Future studies could examine the cases that failed in initial years so as to generate more insights about scaling, along with other success stories. Finally, the paper has methodological limitations with respect to generalizability of its findings. Nevertheless, the case does adequately represent the issues related to scaling in the context of developing countries such as India and BoP customers.

Appendix II: Respondents list

SNo	Name	Organization and position	Interview details
1	Manavsi	Alpha, Vice president, International business	No. of interviews: 4, Used in Paper I and II
2	Alok	Alpha, Business development manager.	No. of interviews: 1, Used in Paper I and II
3	Abhishek	Alpha, Business development manager.	No. of interviews: 2, Used in Paper II
4	Shalini	Alpha, Area sales manager, Zone 1	No. of interviews: 1, Used in Paper I
5	Girish	Alpha, Assistant sales manager	No. of interviews: 1, Used in Paper I
6	Anoop	Alpha, Area sales manager, Zone 2	No. of interviews: 1, Used in Paper I
7	Vivek	Super CSP, owns a pharmacy store	No. of interviews: 1, Used in Paper I
8	Ramesh	CSP, grocery store owner	No. of interviews: 1, Used in Paper I
9	Shyam	CSP, grocery store owner	No. of interviews: 1, Used in Paper II
10	Prakash	CSP, mobile phone store owner.	No. of interviews: 2, Used in Paper II
11	RamRatan	CSP, grocery store owner	No. of interviews: 1, Used in Paper I
12	Aakarsh	CSP, owns a cyber café store	No. of interviews: 1, Used in Paper I
13	Parth	CSP, grocery store owner	No. of interviews: 1, Used in Paper II
14	Gaurav	CSP, stationary store owner	No. of interviews: 1, Used in Paper II
15	Vijay	CSP, airtime dealer	No. of interviews: 2, Used in Paper II
16	Amarinder	CSP, owns a phone accessories store	No. of interviews: 2, Used in Paper I
17	Kishore	Alpha Client, a florist	No of interviews: 2, Used in Paper I and II
18	Pappu	Alpha Client, a migrant worker	No. of interviews: 1, Used in Paper II
19	RamLal	Alpha Client, rickshaw puller	No. of interviews: 2, Used in Paper II
20	Nitin	Independent consultant	No. of interviews: 2, Used in Paper II and III
21	Sachin	Independent consultant	No. of interviews: 2, Used in Paper II
22	Digvijay	Independent consultant	No. of interviews: 1, Used in Jugaad paper
23	Manas	Personal banker, SBI	No. of interviews: 1, Used in Jugaad paper
24	Prashant	Relationship manager, SBI	No. of interviews: 1, Used in Paper II
25	Dhananjay	BC project officer, Cashpor	No. of interviews: 3, Used in Paper II and III

26	Abhi	Branch manager, Cashpor	No. of interviews: 2, Used in Paper III
27	Surbhi	Training manager, Cashpor	No. of interviews: 3, Used in Paper III
28	Rajesh	Assistant manager, Cashpor	No. of interviews: 2, Used in Paper III
29	Sakshi	Senior training manager, Cashpor	No. of interviews: 2, Used in Paper III
30	Ramdev	Loan officer, Cashpor	No. of interviews: 1, Used in Paper III
31	Nitesh	Loan officer, Cashpor	No. of interviews: 1, Used in Paper III
32	Vivek	Loan officer, Cashpor	No. of interviews: 1, Used in Paper III
33	Satyawati	Client, Cashpor	No. of interviews: 1, Used in Paper III
34	Paro	Client, Cashpor	No. of interviews: 1, Used in Paper III
35	Kalawati	Client, Cashpor	No. of interviews: 1, Used in Paper III
36	Pushpa	Client, Cashpor	No. of interviews: 1, Used in Paper III
37	Kalpana	Client, Cashpor	No. of interviews: 1, Used in Paper III
38	Shanta	Client, Cashpor	No. of interviews: 1, Used in Paper III
39	Dhani	Client, Cashpor	No. of interviews: 1, Used in Paper III
40	Bindu	Client, Cashpor	No. of interviews: 1, Used in Paper III
42	Pushpa	Client, Cashpor	No. of interviews: 1, Used in Paper III
43	Pyali	Client, Cashpor	No. of interviews: 1, Used in Paper III

Table 9: Details and profiles of the respondents in this study

Appendix III: Interview guidelines

This appendix provides details on the interview questions developed for this PhD research.

Open-ended and semi-structured interviews

Open-ended and unstructured interviews were usually used for preliminary contacts with informants. Once I established contact with some informants, I designed semi-structured interviews usually divided in two parts described below. First, a set of general questions was dedicated to collect general information on the respondents' profile. According to the participant's answers and willingness to share their experience a second part was carried out, that focussed on specific role within the mobile money sector. The list of questions, presented below, is non-exhaustive but represents the basic questions designed beforehand. Customized questions based on the respondent's profile and experience with organization were added. The questions differed according to their role and the organization they belong to. Thus, different set of questions were devised for informants from Alpha, Cashpor, CSPs, banks and independent consultants. The respondents were given full liberty in discussing the aspect that they thought were important (in some cases to deviate from the question asked).

General questions related to respondent's profile

- Could you please tell me about yourself? What is your educational and professional background?
- When did you join this organization? What other positions (if any) did you hold in this organization?
- Can you tell me more about your current role in the organization? What areas are under your responsibility?

Alpha, Cashpor and SBI

- Could you tell me what you are actually doing in your organization?
- What are your main objectives? How would you describe your main activity?
- How did you start the operations and when?
- Do you finance yourself by donations, or do you provide services for fee, or else?
- What is the organization structure?
- What is the cost structure and revenue model?
- Who are your main partners?
- How do you select your partners?
- What are the advantages to you by entering into partnerships?
- What are the problems in maintaining these partnerships?
- Are you directly dealing with the partners? [Negotiating agreements, following up, price decisions)
- What details and tasks you decide with CSP, banks and MFIs?
- How did you come to select [target organization] as a partner? [Functional need,
- Could you please describe the selection process to me?
- Could you describe the activities in this collaboration? [Projects, term of exchange]
- What are the main objectives of this partnership for your organization?
- Apart from your partners, which other entities you deal with?
- Did you experience partnerships that didn't work in the past? Could you please tell me about it/them?
- What are the key products and services? And how do you offer them?

- What are the challenges in providing these products and services?
- Who are your key customer segments?
- What kind of inputs do you need in providing the key products? Do you own all these inputs?

Super CSPs and CSPs

- When and how did you get associated with Alpha.
- What kind of resources do you need to become a CSP?
- What are your key tasks and responsibilities as a CSP?
- How many clients and transactions you do on a daily basis?
- What kind of products and services you offer apart from mobile money?
- Does the mobile money activity have any impact on your main business activity? If yes, could you please elaborate on it?
- What are the costs and revenues through mobile money services?
- What issues you face in providing mobile money services? How do you deal with them and what kind of support Alpha provided you?
- What are the main benefits to customers in using your services?
- Are there any challenges you encounter while dealing with customers? If yes, what kind?
- Who are your main customers and how do you know them?
- How long have you worked as a CSP?
- How did your role and your interaction with Alpha evolve/change over time in terms of objectives? (for example, the change in objectives, change from controlling to more autonomous, or from mutual independence to more control, from difficult to easy?)

- What is the governance of this partnership? [The people that are involved, the responsible director(s)?]
- How often do you interact with Alpha for this partnership?

Independent Consultants

- What are the benefits of the business correspondent (BC) model in India to the various parties: banks, consumers, agents and BCs?
- How do companies working as BC (e.g., EKO, ALW) select agents and maintain the distribution channel?
- What are the problems and challenges faced by BCs in maintaining the channel distribution?
- Are there any problems related to managing the liquidity, retention or agents, agent's turnover and dormancy of agents?
- The agent management task is performed by the bank or by the BC itself? Do the BCs need to take permission from the bank before recruiting an agent?
- How do the BCs handle these challenges in terms of the strategies they adopt to manage the agent network?
- What are the challenges and constraints faced by BCs in scaling up their business taking into consideration that the operational costs are borne by the BCs, competition among BCs and the small transaction values?
- What are the benefits of partnering with MFIs to BCs and to MFIs themselves? This is crucial considering that some MFIs also work as BCs. Does it harm the scalability of BCs?

- Do the MFIs consider banks as their partners or as their competitors in the long run? If yes, on what basis?
- What is the role of MNOs in the mobile payment ecosystem?
- What is the role of regulator i.e.; the RBI in deploying the mobile ecosystem in terms of the regulatory constraints that are posed by the RBI?
- How is the mobile money market in India different from that in other developing countries such as Kenya?

Customers

- First name, gender and occupation.
- Since when are you using this services and for what reasons?
- How did you come to know of this services?
- How often do you use these services and in what ways?
- How much do you pay for these services?
- Apart from you, anyone else in your family or friends uses these services?
- What are the main advantages of these services?
- Can you tell me how you do a particular transaction?
- Who explained to you how to do a mobile money transaction?
- Any problems you face in doing a transaction? If yes, how do you resolve them and whom do you approach?

Appendix IV: Data analysis

This section discusses the efforts made to visualize and analyse data. Table 10 below presents the data analysis tasks carried out in Paper I.

Data analysis phases		
First phase: chronological organization of data, identifying key actors in the scaling process, new products and processes introduced and other key events during the scaling process. Second phase: Mapping the role of actors to the five key phases identified by Foster and Heeks (2013). The key phases identified were differentiated based on three parameters: the content and focus of Alpha's strategic actions; the structural relations of key stakeholders involved in the Alpha's network; and other statistical indicators of scale such as number of transactions, number of CSPs, new products and number of partnerships. Third phase: Theorizing with bricolage perspective and identifying different forms of bricolage involved in the identified phases and that assisted the diffusion and operation of mobile money system to assist the scaling process.		
Illustration of bricolage codes		
Bricolage of things	Leveraging existing artefacts Leveraging existing relationships. Material reconfiguration	*Leveraging the basic mobile phone handset as a low cost, always on channel to deliver financial services.* *Tap into the existing level of trust and customers' relationships these kiranas have with the locals in their community.* *Every cell phone in an automated teller machines. Kirana stores as a network of human ATMs,*
Bricolage of people	Partnering with local pharmacies and kiranas.	*Leveraging their existing outlets and kirana stores in the vicinity of migrant workers.*
Institutional bricolage	Liaison with old and existing institutions, and systems.	*We explored multiple synergies with our existing partner banks in terms of including their existing customer base into our systems or integrating our systems with theirs.*
Network bricolage	Utilising pre-existing contact networks	*Upgrade large and well performing CSPs to Super CSPs.*

Table 10: Data analysis phases and codes in Paper I

Figure 17 depicts the business model canvas for Alpha. Based on my interviews, I identified each of the nine dimensions of the business model canvas. Business model canvas is a visualization tool developed by Osterwalder & Pigneur (2010, Pg. 44).

The business model canvas contains nine components that collectively assimilate and represent different aspects of a company's entire business model and includes the following dimensions (Osterwalder & Pigneur, Pg. 44).

- *Value proposition* (the unique value a firm's product or service creates for customers), customer segments (group(s) of customers a company targets with its product or service).
- *Customer relationships* (the ways in which a company build relationships with the customer segments it is serving).
- *Customer channels* (the channels a firm acquire, retain and develop to deliver its products/services to its customers).
- *Revenue streams* (the manners in which a firm plans to generate revenue streams and recurrent cash flows).
- *Key partnerships* (the strategic and cooperative partnerships a company needs to enter into to increase the scalability and efficiency of the business).
- *Key resources* (the resource set a company owns that that allows it to deliver its value to customers).
- *Key activities* (the set of activities a firm assumes that enables it to execute its strategy).
- *Cost structure* (the costs associated with each of the above elements).

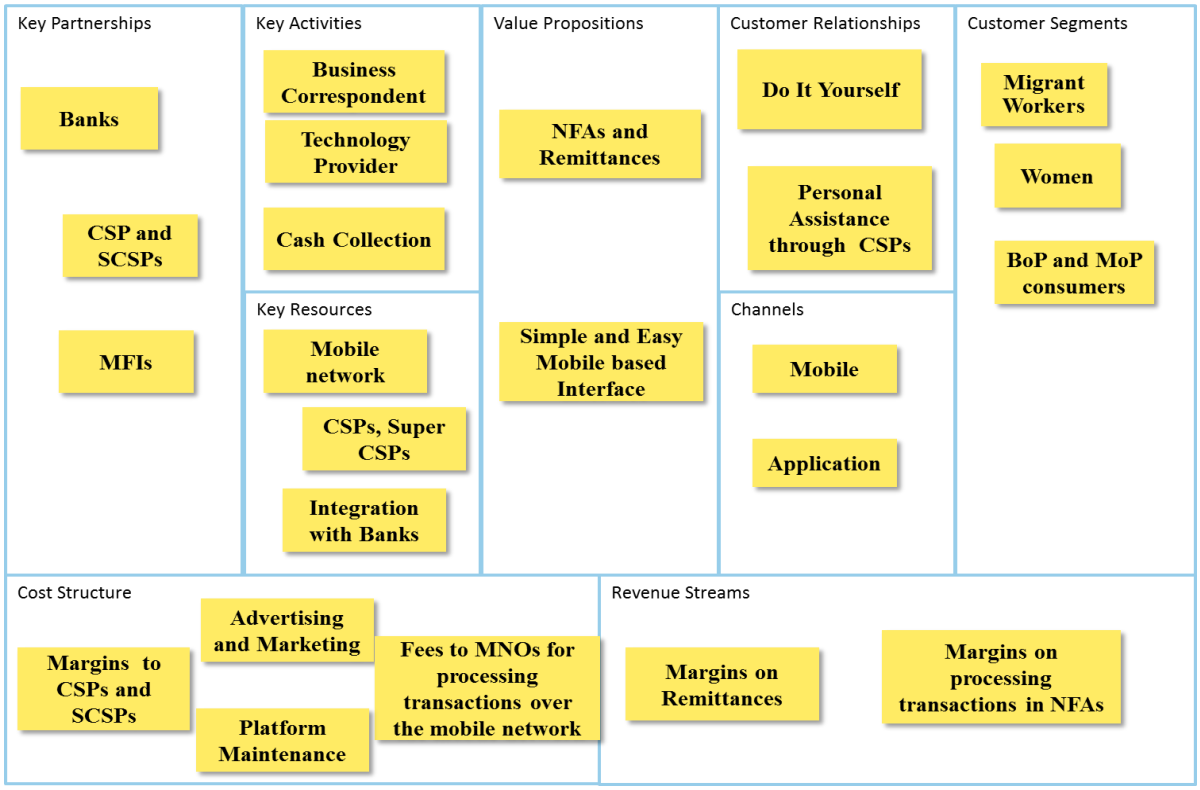

Figure 17: Business model canvas for Alpha India Financial Services.

Table 11 below discusses the data analysis conducted for Paper II.

Data analysis phases		
First phase: Data reduction to represent the chronological organization of data and identification evolution in the business elements. Second phase: Mapping the different elements of business model in line with the business model canvas proposed by Osterwalder and Pigneur (2010). In addition, key data were linked to the four value dimensions of business models (V4BM) proposed by Al-Debei and Avison (2010). The value co-creation dimension and its links with the other four dimensions in V5BM. This phase could be viewed as a data display or a visualization phase and the results are depicted in Figure 12 and 18 respectively. Third phase: Further exploring the value co-creation dimension to identify different ways in which value co-creation. Investigating the different aspects of the five value dimensions in the particular context of BoP.		
Illustration of value dimensions		
Value proposition	Customer segments Key offering in terms of products and services (for customers, banks and CSPs)	*BoP, migrant workers, rural poor.* *No frills accounts, remittances, savings. extended customer base, increased income, reduced cost of transaction and customer footfall.*
Value architecture	Key resources, assets and core competencies (physical, technological, financial, and human)	*Simplibank, the technological system.* *Network resources (SBI logo and brand image)* *Human resources (kirana stores as CSPs)*
Value network	Innofusion intermediaries that undertake innovation and diffuse the products and services Network of stakeholders	*CSPs adopt flexible opening hours, provide paper receipts to confirm transaction, undertake inquiry about the new customers and recording transactions.* *Strategic alliances with non-competitors such as Cashpor, an MFI.*
Value finance	Costs and revenue structure, and margins.	*Margins from remittances and transactions. Charges on processing mobile transactions.*
Value co-creation	Value exchange Value addition	*Alpha sources accounts for SBI and SBI shares it knowledge about the banking transactions.* *CSP assisted banking. Risk reduction for clients.* *Social and informal controls in form of*

	Value through governance	*know your customer*. *Limit on the transaction amount per day and per month.*

Table 11: Data analysis phases and summary for paper II

Finally, the data analysis steps undertaken in Paper III are illustrated in Table 12 below.

Data analysis steps		
First step: understanding background of microfinance sector and in particular the status of women in their families. Examined various data points to understand what is going on here? why is it done? and how this innovation is fostering inclusivity? What are the factors and the barriers the support/impede this innovation and who is in charge of factors and actions to tackle the barriers? Second step: extracting various data points to discover commonalities and patterns that could be clustered under unique but distinct labels. These labels were then theorized considering the key criterion of inclusive innovation framework. For example, all the data points shedding light upon the "problems relevant to women" in Cashpor were clustered under "precursors'.		
Illustration of themes		
Precursor	Problems are relevant to the women	*Inability to save money, maintain bank account, high cost of travelling to the bank branch*
Adoption	Capabilities to access and afford banking services	*Mobile number as the account number*
Impact of inclusive innovation	Impact measured as change in livelihood assets.	*Asset substitution by saving money on travel to banks* *Asset improvement as mobile enabled savings are used for unforeseen situations such as illness.*
Product and process	Introduce new product and processes directed at women.	*Cashpor Mahila Sashaktikaran Loan to buy mobile phones.* *Digitization of account opening form and tracker.*
Infomediaries and intermediaries	Women and loan officers as infomediaries.	*Women comfortable with technologies training other women in the group.* *Loan officers training women and disseminate vital information to women such as advantages of savings and informing balance at the end of transaction to women who cannot read.*

Table 12: Data analysis steps and key themes in Paper III.