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Comparative Analysis of Mobile Payment Sectoral Systems of Innovation and Service Innovation between the United Kingdom and India

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DECLARATION

In accordance with the University of Edinburgh Regulations for Research Degrees, the author declares that:

(a) This thesis has been composed by the author

(b) It is the result of the author's own original research

(c) It has not previously been submitted for any other degree or professional qualification

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Abstract

The financial services industry is one of the most rapidly growing industries worldwide. Although mobile payment (m-payment) systems have generated a lot of hype, not all supportive infrastructures are in place where one firm's service can be applied globally. Technology has provoked major changes in this industry with how firms operate and innovate as well as how they adapt their business models. Additionally, how services expand and understanding the ways new services are developed in different countries are becoming increasingly relevant. This qualitative, multidisciplinary study compares the sectoral system of innovation (SSI) and service innovation of m-payment systems between a developed country, the United Kingdom (UK), and a developing country, India. The dissertation draws upon 27 original interviews in the UK and India in order to analyse and identify the drivers of innovation.

The analytical framework is designed for a firm-level analysis where variables affecting the resources and capabilities act as a way of integrating knowledge and influencing the innovation process. The main research questions are: how does a diverse SSI shape business models within the m-payment systems; why and to what extent do the processes of service innovation differ between m-payment systems as explained in the UK and India? The SSI approach links innovation to the interactions of the different actors in the economy and the system. Innovation is either the process of creating or the recombining of knowledge for some new use to become an outcome of that process. Innovation does not sit within the boundaries of an organization nor does it sit neatly at one level, but instead it is a multifaceted construct.

Thirteen case studies are employed with the main industries being banking, telecommunications and technology. A thematic analysis is applied in using an inductive, exploratory approach from an interpretive perspective. The outcomes of interpretism are helpful in presenting an understanding of the causal mechanisms of innovation through a theoretical framework of resource-based view (RBV) and knowledge-based view (KBV).

Findings from the research will show a lack of an all-encompassing and exhaustive perspective of m-payment systems. A hindrance of innovation has caused a fundamental problem identified in the UK showcasing a lack of strong innovative, specific institutions; while in India, poorly managed implementation of institutions has led to strengthening of cognitive institutions amongst firms. In particular, innovation in emerging fields that have yet to reach their technological maturity is just as strong in developing countries as compared to developed countries. Furthermore, innovation happens in developing countries through processes that are more complex than originally conceptualized.

The contribution to the theoretical understanding of innovation is two-fold. Firstly, in researching mobile financial systems in a developed and developing country, an m-financial SSI framework is constructed that is usable by policy-makers, analysts and firms exploring their value chain positioning. Secondly, the research emphasises the importance of integrating firms' activity (including new product and service design) into integrated service systems since the particular nature of these systems for m-payments varies between contexts. Therefore, the research helps to show how m-payment systems vary and in particular what are the drivers of innovation between a developed and developing context. Thus, existing theory needs to take into consideration the possibility that emerging market firms are perhaps more innovative than developed countries, and as a consequence, future research should address this with caution. For management practice, the research has shown that there is still not a complete model in explaining the performance of firm level innovation. For practitioners, innovation and technological development needs to get better at interoperability with users and merchants. Furthermore, business models will need to evolve from limited proprietary solutions towards cooperation and standardised solutions if there are to be successful, global firms.

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Acronyms

Basic Bank Account Number (BBAN)
Bottom of income pyramid (BoP)
Business Correspondents (BCs)
Business to Business (B2B)
Business to Company (B2C)
Customer Service Points (CSPs)
Customer to Government (C2G)
Electronic money (e-money)
Electronic Money Regulations (EMR)
European Union (EU)
Fasters Payment Limited (FPL)
Financial Services Authority (FSA)
Foreign Direct Investment (FDI)
Interactive Voice Response (IVR)
Interbank Mobile Payment Service (IMPS)
International Bank Account Number (IBAN)
Knowledge-based view (KBV)
KYC (Know-your-customer)
Mobile banking pin (m-pin)
Mobile Financial Solutions (MFS)
Mobile Money Identifier (MMID)
Mobile Point of Sale (mPoS)
National Payments Corporation of India (NPCI)
National Systems of Innovation (NSI)
Near Field Communication (NFC)
New Service Development (NSD)
Payment to Payment (P2P)
Personal Identification Number (PIN)
Point of Sale (PoS)
Radio-Frequency Identification (RFID)
Research and Development (R&D)
Reserve Bank of India (RBI)
Resource-based view (RBV)
Reverse Product Cycle (RPC)
Sectoral System of Innovation (SSI)
Short message service (SMS)
Telecom Regulatory Authority of India (TRAI)
Telecommunications (telcos)
United Kingdom (UK)
United States (US)
Unstructured Supplementary Service Data (USSD)
Value added services (VAS)
Wireless application protocol (WAP)

Chapter One: Research Introduction

1.1 Introduction

This multidisciplinary research aims to generate an understanding of sectoral system of innovation (SSI) and an in-depth comparative analysis of the innovation process in a specific service of mobile payment (m-payment) systems between a developed country, the United Kingdom (UK) and a developing country, India. In addition, this research will analyse the business models implemented within the SSI of the mobile finance system. Specifically, this dissertation looks at how institutional arrangements of SSI systems shape innovations in m-payment systems in the UK compared to India. This is done by constructing and comparing the m-payment SSI in the two countries as well as the process which direct innovation in each case. Unlike interpretations of SSI (Breschi and Malerba, 1997) criticized as descriptive and deterministic, the SSIs view builds upon Ogle's (2008) ideas space to emphasizes active agency. Furthermore, research in the innovative process of a specific service is not necessarily new, but few services have succeeded in being highly innovative to where it generates new markets or reshapes existing ones, especially within a developing country. Thus, it enables one to comment on the degree to which m-payment firms in the UK are differently innovative than their equivalent firms in India.

This dissertation draws upon different streams of literature in order to explore the interactions of sectoral innovation systems and service innovation in both a developed and a developing country. Three streams are particularly relevant in positioning this research in the literature: systems of innovation, service innovation and mobile payment systems. Unsurprisingly, the streams of literature are not independent since there are many possible interdependencies between the literature of the nature of firms' innovation process especially in the characteristics of the sectoral system and service innovation. The empirical study presented in this dissertation intends to contribute in various ways to these streams of literature while pointing to some limitations, conflicts and complementarities.

1.2 Research Background

The research specifically focuses on the emerging literature on sectoral systems of innovation in developed countries (Malerba, 2002). It is widely recognized in which the analysis of innovation systems is used to discuss the role of different institutions and sectoral policies in different levels of aggregation (Freeman, 1987; Lundvall, 1995; Malerba, 2002; Nelson and Rosenberg, 1993). By looking at the systemic interactions, this becomes widely acknowledged as being core for identifying the evolution of firms' technological positions (Barnett and Burgelman, 1996; Bell and Albu, 1999). By understanding the underlying networks in different sectoral settings, this can provide fundamental input for policy-makers who are interested in designing public and private partnerships whom promote the dynamic of sectors. Particularly, it is important to analyze the sector in early stages of network formation when key players and their mechanisms of interaction are still indeterminate, and interventions can result in a profound impact on the resulting firm.

The SSI approach links innovation to the interactions of the different actors in the economy and the system. These actors combine to generate and disperse innovation. Initially, the system of innovation approach has been developed within national boundaries. Thus, often times, it is referred to as the national systems of innovation (NSIs). Recently, developments in the systems of innovation research have focused on regional levels. The importance of a regional dimension of systems of innovation is more or less related to knowledge such as spill-over effects, transfer and learning. For this research, it will focus on the sectoral system of innovation. SSI refers to a specific group of firms that develop a sector's product and generate a sector's technologies. These specific firms are linked through interaction, competition, strategies and alliances, and selection in innovation and market activities (Edquist, 2005).

Firms are increasingly relying on partners to be innovative, yet, can the same be said when partnerships are required in offering the service? Tether (2002) in the UK identified that firms who partner for innovation produce better outcomes and are more successful than firms who do not. This suggests that strategic collaborations and partnerships benefit all parties involved (Miles and Snow, 1986; Gulati, 1998).

Thus, it appears that Porter's (1985) notion of competitive advantages has been refined to incorporate a collaborative advantage (Dyer, 2000: Kanter, 1994), but despite the importance of partnerships, these relationships in regards of creating innovation are still not well understood. Specifically, little is known about how partners add value and how partners are involved in the innovation process (Eisingerich et al, 2009).

As Gupta et al (2007) states innovation is either the process of creating or the recombining of knowledge for some new use to become an outcome of that process. Innovation does not sit within the boundaries of an organization nor does it sit neatly at one level, but instead it is a multifaceted construct. Empirically, it has been desirable to place boundaries on innovation while examining it in the context of a single organization, yet innovation is rarely contained within one organization where it develops and appropriate its value (Ahuja, 2000; Rothaermel and Hess, 2007).

As the literature shares, there is a large number of competing classifications, especially when it comes to service innovation (Hipp and Grupp, 2005; Fikkema et al, 2007). These can be categorized into one of three different types: newness, area of focus and attribute (Coopey et al, 2002; Zaltman et al, 1973). However, in and of themselves, each of these approaches and categorizations provide the mechanisms by which some sense can be made of the diversity of innovation and innovation process. Yet, research on innovation systems and classifications have appeared to be associated with inconsistent or contradictory, complex results (Wolfe, 1994). Nevertheless, innovations are developed and applied from different perspectives and in different social contexts, which makes each innovation process unique.

Specifically, for this research, mobile payment systems include m-payment, mobile banking (m-banking) and mobile digital wallet (m-digital wallet). An m-payment refer to person-to-business or person-to-person payments made with a mobile phone. M-banking is a connection between a mobile phone and a bank account. An m-digital wallet refers to the cash value that is stored on the phone. In a way, this research studies aspects of mobile telecommunications; however, the discussion is

not limited to its most basic service, which is that of voice communications. Rather, with the advances in technology, there has been development and implementations of numerous additional services. For m-banking in developing countries, banks tend to view it as a way to enhance service to existing customers, while telecommunications (telcos) firms are more focused on addressing the mass market and the un-banked (Ivatury and Mas, 2008). A more detailed explanation of the actors and technology involved in m-payment, m-banking and m-digital wallet within the sectoral system of innovation is given in Chapter Five.

1.3 Purpose and Justification of the Research

The foundation of many studies of innovation is the assertion that innovations differ from the other, and through these differences, it explains variance in firms' performance, innovation performance and innovation process. In order to research this area, specifically service innovation within a sectoral system, it requires a constant framework to enable the comparison of innovations between the two countries. Thus, given the complex and intricate m-payment framework in both countries as well as insights from literature, the expectation is that this research will find lower levels of m-payment engagement in the developed country as compared to the developing country. Furthermore, it is anticipated that considerable effort will be required to create awareness to the service and the value propositions in both countries in order to increase consumer and supplier engagement in m-payment systems.

The majority of India's economic growth is tied to progress in the service sector. India's quick adaptation to both endogenous and exogenous technological advancements explains the significant growth in the service sector (Eichengreen and Gupta, 2010). Their parliamentary system of government has been designed largely on that of the UK, the Westminster system. Overall, India is globally recognized for their contribution to innovations in industries such as high-tech products and services, but interest in innovation within India has been centred on research and development initiatives in formal sectors of the economy (Dahlman and Utz, 2005). India is characterized by a significant degree of heterogeneity in economic enterprise given that the majority of its population is active in informal sectors such as in agriculture

(Mashelkar, 2001; Dahlman and Utz, 2005). As will be shown in this research, India is a heavily regulated country with a protected, socialist economy. Thus, services, especially government services that focus on the financial inclusive user base, are critical to the requirements of the country's burgeoning population. In sharp contrast to the living situations that persist in an emerging economy such as India, the vast majority of households in developed countries such as the UK have available access to public infrastructure, specifically landlines for telecommunication services.

As technology has matured for mobile payments, so too has it created further development of techniques to support this service context. An m-payment transaction is more multifaceted than traditional banking or retail transactions because they typically involve a complete complex service chain executed in a remote manner. Several other factors contribute to the complexities of m-finance applications. Firstly, the mobile marketplace has been in a constant state of change where this change comes in the form of new functionality or new technologies. Secondly, m-finance solutions are inherently distributed and asynchronous requiring strict adherence to well-defined protocols as well as standards in maintaining application integrity. Thirdly, transactions can occur over a longer duration since the user can take advantage of the virtual experience whereas the traditional experience tends to be done in a shorter start to end timeframe. Finally, the integrity requirements of a mobile commerce system forces the application to constantly monitor and deal with errors often in real-time which requires an architectural infrastructure of resources that supports this kind of capability.

Some studies have optimistically argued that firms can alternate and balance the countervailing forces which encourage variety and divergence with those that increase focus and convergence (Sheremata, 2000) where cycles of possibility become cycles of action (Hargadon and Fanelli, 2002). Pessimistically, other studies caution about the pervasive organizational tendencies that crowd out variation (Benner and Tushman, 2002; Lewin et al, 1999) and lead to lower levels of knowledge as well as lower rates of learning (March, 1991). Thus, as Leonard-Barton (1992) calls 'the rigidity paradox' where competencies that have, at first,

helped innovation, but over time, hinders it. Innovation literature has extensively suggested that industries and firms will periodically pulsate between periods of experimentation and periods of refinement, especially as technological changes evolve through distinct phases. These phases are a fermentation stage followed by emergent designs to the selection of a dominant design which lastly creates incremental improvements and continues until a new technological discontinuity triggers the next innovative cycle (Anderson and Tushman, 1990). In between these stages requires effective transitions of a fine balance between short-term adaptation by firms and actors as well as sustained adaptability to unpredictable exogenous challenges (Nelson and Winter, 1982; Levinthal and March, 1993).

The adoption of m-payments and other financial infrastructure can greatly lower the costs of financial services as well as provide substantially greater access to firms and individuals. By increasing efficiency of operations, m-payments can increase economies of scale where it can lead to greater consolidation and evolvement of the financial services industry (Allen et al, 2002). With these findings and the ongoing evolution of the industry and sector, it seems likely over time that new services, new delivery channels, and new or hybrid institutions competing will significantly change the financial service industry in both countries. Thus, financial services are entering a period of Schumpeterian competition and creative destruction where innovations are radically changing the nature of competition (Schumpeter, 1942). Furthermore, mobile banking and payments may fundamentally change the global financial services industry. Therefore, under these conditions, inventive new firms in either country are gaining market power while older, more established firms either must change their strategy and business models, or these firms risk the chance of fading away if they cannot compete effectively in the new market realities.

New kinds of payment systems may have surprising effects on competition in the industry such as costs and economies of scale, new entrants and institutional competition as well as demand for higher service quality in the UK, and even in emerging market such as India. One of the main effects, though, is customer loyalty since it affects a firm's bottom line through increased sales, lower marketing costs

and lower customer turnover (Turban et al, 2000). Furthermore, the so-called 'un-banked' customers, or those with no bank accounts, are starting to use these banking and payment technologies such as prepaid cards which is bringing such customers into the financial mainstream (Isern et al, 2006). These cost-effective approaches are expanding financial services to a large market potential of people who are un-banked or under-banked.

The m-payment framework is complex where it consists of many firms, or actors, in the ecosystem. Strategic alliances and partnerships are being formed between telecommunication operators, financial service firms, retailers, technology/software firms and other entities. These partnerships are enhancing value and expanding services in order to meet rising consumer demand in both countries. Undoubtedly, the convergence of firms in these diverse sectors is imperative only if firms are to successfully compete within the new business landscape while, at the same time, achieving the desired value propositions. Regardless of exponential growth predictions in m-payment services, fundamental challenges continue to hinder engagement in both developing and developed countries. One of the hindrances focuses on the power struggles that affect organizational engagement, specifically, between the banks and telcos with regards of the end-user relationship as well as a complex market in needing actors to generate interest on both the supply and demand sides of the market (Ondrus and Lyytinen, 2011).

1.3.1 Research Questions

Malerba's (2004, 2005) sectoral systems of innovation argues that innovation in a sector is considered to be affected by three groups of variables such as: institutions; actors and networks; and knowledge and technologies. Building on Malerba's system approach, this research will examine how this influences business models for m-payment systems and how it compares and contrast between the two countries. Thus, the first research question is as follows: *how does a diverse sectoral system of innovation shape business models within the mobile payment systems?*

Mobile services such as m-payment systems have frequently been identified as the new service frontier (Kleijnen et al, 2004) as well as value-added services (Nysveen et al, 2005). For new services such as m-payments, developers of new services focus more on the desired experience of users of the services. Innovative services can be developed which meet the needs and expectation of users, and thus, it can improve revenue production for the firm (Meyer and Marion, 2010). By considering the needs of customers, this is an important factor in developing new services, but placing too much emphasis on the desires of existing users can impede innovation because it focuses on incremental, marginal improvements in performance of a new service (Hermann et al, 2006). Thus, the second research question is as follows: *why and to what extent do the processes of service innovation differ between mobile payment systems as explained in the UK and India?*

1.3.2 Definition of Terms

For the purpose of this research, the terms emerging economy and developing country are used interchangeably. These terms are defined according to the World Bank's definition as such an emerging economy is seen as a country with low to middle per-capita income (World Bank Report, 2011). With this definition, India can be defined as an emerging economy since it has rapid growth and industrialization currently underway. Developed countries are, therefore, defined as nations characterized by high nominal Gross Domestic Product, advanced levels of industrialization, highly developed infrastructure and superior standards of living as compared to emerging economies or developing countries.

Most strategies, business models and implementation of innovation plans in developing countries have been based on theories and experiences of developed countries. However, because of substantial differences, these strategies and models from developed countries may not be directly applicable to developing countries. Table 1.1 below summarises the differences between a developed and developing country (Chen et al 2006). The main comparisons are on the basis of four main factors: history and culture, infrastructure, citizens and government.

	Developed Countries	Developing Countries
History and Culture	Gov't/economy developed immediately after independence; economic growth constant; high standard living; historical democracy; transparent gov't policy/rule	Gov't usually not defined; no economy increase in productivity/growth; low standard of living; short democracy; less transparent gov't policy/rule
Infrastructure	Good infrastructure; high internet access for people	Bad current infrastructure; low internet access for people
People/Citizens	High internet access/computer literacy with minor digital divide and privacy issues; more experienced in democratic system; more active participant in gov't policy making	Low internet access; people reluctant to trust online services; illiteracy for computers; less experience in democracy; less active participation in gov't policy-making process
m-services	Decent computer literacy; dedication of resources	Low computer literacy; low dedication of resources; lack of knowledge on m-services

Table 1.1 Differences between Developed and Developing Countries
Source: Chen et al, (2006)

Definitional aspects for services can be described as having four characteristics that differentiate service products from physical goods: intangibility, heterogeneity, inseparability, and perishability (Lovelock, 1983; Zeithaml et al, 1985; Lovelock and Yip, 1996). Intangibility distinguishes the nature of the service act and who or what is the recipient of the service (Lovelock, 1983). Tangible services are direct such as healthcare or transportation and other physical possessions whereas intangible services are actions directed at people's minds or other intangible assets (Lovelock, 1983). These intangible assets can include such things as banking, legal services, accounting, securities or insurance. Heterogeneity is the degree of the service uniqueness that is provided to consumers. It is present when services vary from one consumer to the other. Financial services are customized to deliver varying degrees of financial risk, investments and goals for each service client depending on individualized consumer objectives. In contrast, homogeneity assumes that there is a high degree of service consistency and standards in quality and reliability for delivery. Inseparability is when goods are produced and consumed simultaneous. At times, it is when the customer is considered a co-producer of the service; examples include air travel and hotel services. Opposite to inseparability, separability is when the customer is not involved during the production and does need to be present during the service consumption. Thus, some services can be separated from the

production and consumption processes as well as from the service provider and consumer. Perishability is when a service cannot be captured or stored for later use such as in the case of hotels since rooms are either occupied or not occupied; and service capacity use varies accordingly. Contrasting aspects include examples of non-perishable services such as new broadcasts or music recordings where the creation of the service product can take place at a different time from the service consumption. The definition, though, of service innovation will be discussed in more detail in Chapter Three, but in using Berry et al's (2006) definition it is the exploitation of an idea for a performance that is new to the firm and perceived by the customers to offer new benefits.

1.3.3 Mobile Payment System

This section gives an overview of the different actors involved in the mobile payment system. The system is complex because it involves value chains payments, mobile retail, and technology actors colliding and vying for pole position. Some actors are involved primarily in enabling the payment service or involved in the payment transaction itself; and some are involved in both the payment and transaction.

The actors involved primarily in enabling the payment service are the mobile device manufacturer and mobile network operator, or telecommunications network. The mobile device manufacturer can gain a competitive advantage by building devices that support mobile payments such as NFC-enabled mobile devices with secure elements that store the payment application and account information. The mobile network operator provides the channel through which payment applications and consumer data from banks or financial institutions can be delivered to the secure element on the mobile device. Thus, the mobile network operator is responsible for the integrity of the keys and certificates that are used to protect communication across its network. The data itself is encrypted by the payment before transmission using another key known only to the payment application.

The actors involved primarily in the payment transaction are the merchant and technology firms. The merchants need to be within the existing contactless card

payment infrastructure in order to accept NFC mobile payments. The technology firms are involved in authorizing and settling the transaction through existing financial networks. In other words, these firms are involved in the operation of the bank-end payment processing.

The actors involved in both the payment and the transaction are the bank, or financial institution, digital wallet provider, and the customer, or end-user. The bank or financial institution role is very similar to their traditional role in the credit/debit card transactions. The digital wallet provider supplies an app or service that manages financial instruments such as credit/debit/coupon cards. The end-user is the consumer of the mobile payment service who plays a critical part in the payment transaction as well as enables the payment process. The end-user will initiate requests for the issuance of payment credentials and makes choices, at times, regarding mobile network operator, mobile device, financial institutions and merchant.

1.3.4 Anatomy of a Payment

For the purpose of this research, mobile payment, or m-payment, is defined as any transaction paid for using a wireless mobile device. Thus, a transaction can be classified as the purchase of airtime, point of sale payments, and person-to-person transfers. An m-payment involves a structured process where each part of the process is connected by various systems from many, different firms. Therefore, the service chain can become complicated if any part of the service does not work.

A payment system can either be a public or a private network that is established to facilitate the movement or transfer of money by using a range of cash substitutes such as credit cards, checks, drafts or other negotiable instruments (Goodfriend, 1990; Geva, 2009). Remittances are one example of many kinds of transactions that move through a payment system. The rules of the payment system helps to orchestrate messaging and payment instructions associated with one or more transactions. However, network membership is, at times, limited to qualifying banks and/or financial institutions subject to strict criteria. Messaging refers to the payment instructing money moving from a payer's institutions to the payee's institution. This

allows for the transfer of the transaction information between the capturing and dispersing parties. The actual transfer of the cash is known as the settlement. Clearance refers to the set of processes leading up to the settlement of a transaction and can include matching the payment instructions with the settlement functions.

Overall, messaging and settlement functions vary in complexity, which in turns, impacts the speed of the transaction. Thus, when there is a regular two-way flow of cash between two parties, net settlement can occur at daily intervals, but can add additional complexity with the more parties involved. In addition, correspondent banks are financial institutions that carry out specific services on behalf of banks or other businesses because non-bank remittance businesses lack direct payment system access in particular areas. Therefore, they must rely on correspondent relationships with banks to have such access. Likewise, banks that do not offer payment services may require these kinds of correspondent relationships in order to carry out remittance transactions.

1.3.5 Overview of the Payment Process

The process of a payment begins when a customer uses a sending financial institution to send money to an intended recipient. The recipient, or payee, is able to access funds through their receiving institutions where transactional information may be sent from one institution to another, but the actual transferring of funds may not occur until later in the day when multiple transactions between sending and receiving institutions are batched to be transferred as a single payment. Cash can move between these two institutions where it is likely to flow in both directions. Therefore, the clearance, the process of calculating counterparty obligations, can result in netting to ensure batched, end-of-day payments account for these flows.

During the interregnum between a payer's payment and end-of-day transfers of cash to the receiving institutions, payment system participants have to decide whether to release funds to the ultimate payee or wait until clearance is complete. If a financial institution releases funds before settlement, then they expose themselves to the risks of defaulting on the end-of-day payments. Specifically, financial institutions that

release funds to the payees are effectively providing credit to participants elsewhere in the system, and defaults can trigger chain reactions.

The basic, physical structure of implementing a payment involves, on average, seven steps and can be applied to both the UK and India. A payee wanting to send an amount of money of say £250 abroad will go to their local wire transfer agent. The person will then fill out some forms indicating their name, address and amount being sent to the recipient's identity and location as well as the currency of payment. The transfer agent will collect this information and charge the payee a fee based on the applicable exchange rate, the service charge for wiring the money, the costs of accessing the payment network through the agent's correspondent banks, and additional charges associated with making the payment if it is not in cash. The customer will receive a PIN number that is provided to the intended recipient. The agent sending the money sends messaging instructions regarding the transaction to the correspondent bank. The correspondent bank will use proprietary hardware and software to access the payment system privileges. Lastly, the dispersing agent's correspondent bank receives a message and payment instructions. Those instructions are then passed onto the inbound transfer agent where the intended recipient is waiting to receive the money while having the PIN code. Thus, the speed of this process depends on a number of variables related to the payment system itself, but particularly the financial institutions' relationships as well as the banking infrastructure in the sending and receiving jurisdictions. Overall, these variables will determine whether payment processing takes minutes, hours or days.

1.3.6 Restrictions on the Concepts of the Research

The analysis variables for this research are chosen only as those related to the firm and the sector of m-payment systems. Factors such as historical experience, national education and training system, cultural effects, etc are kept outside of this research because these aspects may cause the research to be broadly framed and prevent it from reaching reliable results as well as making generalizations. Bringing in more variables would further complicate the research. In summary, the firm is the core of

all systems of innovation concepts and will be the relevant area chosen to investigate the emerging sectoral system of innovation in m-payment systems.

1.4 Research Significance

The internet and mobile phones are creating modern payment infrastructure that is already well established in several developed markets such as the UK. Increasingly, these technologies are being introduced in other countries like emerging markets. As emerging markets develop infrastructure, advances in payment infrastructure are opening new opportunities for the financial sector. Thus, a key question is whether these technologies and innovative payment infrastructures provide purely new delivery channels for established financial products or whether these payment infrastructures have the potential to shift the competitive landscape for all the firms in the ecosystem. Historically, many governments in these emerging markets have neglected the financial sector's potential contribution to economic growth since fledgling banking systems have been seen as monetary means to achieve the government's development objectives (Berthelemy and Varoudakis, 1996). Consistent with this idea, many of these same governments actively repressed financial institution growth by imposing tremendously high reserve requirements for opening an account while directing the flow of bank capital toward favoured projects (Bandiera et al, 2000).

The development as well as the introduction of new and unique services can be one of the most effective ways for all firms to succeed in the market and gain a competitive advantage. Thus, advantage in the marketplace can be gained from controlling sparse and valuable resources that are either difficult or costly to acquire (Sirmon et al, 2008), and from having an organizational culture that supports innovative service development (Berry et al, 2006).

As seen in previous literature, typically, developing countries have been classified as followers and imitators of advanced technology (Ernst, 2003). Thus, these countries' contribution to the global world of knowledge and technology are underestimated and not sufficiently acknowledged (Chudnovsky et al, 2006). Yet, emerging markets

are in the position of developing stronger financial infrastructures that can become more advanced than those in more established countries.

1.4.1 Research Process

The research makes a number of key contributions theoretically as well as for practitioners. Embedded in the interpretivism paradigm, the research adopts the notion of a stratified epistemology. Moreover, it considers the process of innovation to be systemic and non-sequential influences by multiple stakeholders and their interactions in providing the service. In addition, it complements the SSI approach with a meso framework to offer a powerful explanation of the complex interplay of the m-payment service. Deriving from service innovation, the research addresses the lack of research on m-payment systems from a comparative analysis within various sectoral elements of agents, knowledge, learning and institutional influences.

1.4.2 Theoretical Significance

There is no single theoretical framework which depicts all the various ways that technological innovation occurs. Indeed, innovation occurs differently across diverse industries and technologies as firms attempt to develop products and processes which meet the market demands. Applying this in the context of an m-financial service where firms from various industries come together to deliver the service can be difficult to define the innovation. Differences in industry structure as well as markets impose different constraints on the innovation process. Thus, this suggests that there are different pathways to the innovation process where success in these differences needs to be considered.

Innovation research for services, typically, has argued in which successful innovations are driven by resources that are internal to the firm or organization. This resource viewpoint (Barney, 1991; Wenerfelt, 1984) challenges research on inter-organizational relationships since it is argued that resources are available beyond organizational boundaries, and is highly important for organizational success (Gulati and Gargiulo, 1999; Stuart, 2000). Stuart (2000) as well as Teece (1992) has argued that innovation is influenced by uncontrolled factors of the organization which, in a certain way, compel firms to collaborate with others in order to develop innovations.

These inter-organizational relationships complement the resource based view since external resources need to be processed internally where it enables organizations to operate and innovate more efficiently and effectively (Kogut, 1988). Indeed, these relationships that integrate key partners in new products or service development processes are critical for the development of innovations (Ritter and Gemunden, 2003), and, ultimately, for organizational advancement (McGinnis, 2000).

Firms face competitors with resources and capabilities which are different from their own. Furthermore, new firms, or players, compete with incumbents who have entrenched capabilities and complementary assets (Teece, 1986) as well as single-unit businesses compete with business units who are connected to better networked and more resourceful corporate parents (Chang and Singh, 2000). In new markets, opportune access to relevant external knowledge is a condition for survival in dynamic environments. However, any advantages are duplicated quickly by rivals and can, therefore be short-lived. In stable markets, privileged access to certain capabilities can confer, at the most, a temporary source of performance gains.

A review of literature relating to m-payment has found an extensive volume of m-payment studies; most of which focuses on m-payment technology acceptance. As such, there is a plethora of literature pertaining to the diffusion of m-payment technology. Additionally, there is considerable m-payment literature examining consumer attitudes and factors affecting consumer adoption. Most of these researches were underpinned by economic theory.

1.4.3 Practical Significance

The exciting aspect about this research is that it represents a dynamic field or sector. The existing body of innovation and international business literature has been on industries and products derived from far more sedate technologies in markets that are much more stable economically. However, the constantly evolving, innovating and morphing of mobile financial services is a focus of enthusiasm. Thus, there is a need for vital knowledge and insightful contributions within m-payment systems. These include the need to better understanding the compositions of organizations in inter-organizational alliances, business models that meets scalability and market

adaptability requirements, and an enabling regulatory framework that is effective as well as ensuring reliability in m-payment systems.

Research outcomes reveal occurrences of incremental innovation amongst firms in both countries yet different aspects of the process of the service. There are limited innovations as a result of the systemic interplay of many sectoral elements identified and presented. However, the practical significance in terms of the field of international business is that the variations of meanings and the ensuing challenges, problems and difficulties are magnified because of linguistic and cultural differences. Even the linguistic and diverse nature of international research engenders a whole host of complexities, particularly when using comparative analysis across firms operating in differing socio-linguistic environments, albeit with technological similarities (Hofstede et al, 1990).

1.5 Research Structure

This research uses multi-case studies. Case studies are appropriate when the description of a contemporary event or phenomenon is the goal of the research (Eisenhardt and Graebner, 2007). Yin (2009) further emphasizes the use of case studies are relevant when an in-depth description of a social phenomenon is undertaken.

1.5.1 Research Approach

The research is inductive and exploratory wherein resource based and knowledge base theory constructs frame the theoretical argument in order to examine m-payment systems in the UK and India. Particularly, the research explores the innovation aspects of m-payment systems and the alliance configurations as well as the interactions of engagement. Key theoretical constructs considered in this examination include regulatory enablement, maturity of banking infrastructure, maturity of telecommunications infrastructure and interoperability of m-payment systems. This framework is outlined in Table 1.2 below.

Research Framework	
Research component	Innovation process in m-payment systems
Areas of analysis	SSI and service innovation engagement in m-payments in developed country and developing country
Practitioner component	Firms engaged in m-payment services in two culturally, historically different countries
Theoretical framing	Resource-based view, Knowledge-based view
Method	Qualitative, semi-structured interviews for case study strategy
Research Questions	The first one focuses on SSI and business models, while the second one focuses on innovation process in services
Contribution	To theory: contribute to the extant scholarly knowledgebase pertaining to SSI, service innovation, and m-payment systems To Practice: Provides practitioners with a plausible framework to examine innovations in both developed and developing countries

Table 1.2 Dissertation Framework

1.5.2 Methodological Approach

The research takes the interpretivism approach while explaining the qualitative methods taken in understanding SSI and service innovation in both countries. It uses data from 27 semi-structured interviews as the basis of 13 case studies. Interviews were with insiders, government officials and managers of the various firms in the context of m-payment systems. A thematic analysis of the interview data was used in order to seek answers to the main research questions.

1.5.3 Limitations and Scope

It is also important to consider some limitations and scope to the research. There is an abundance of academic research on innovation systems as well as interchangeable definitional aspects of the term innovation, and other associations with innovation. This research does not investigate the process of diffusion of ICT productions and services in the sector (Pohjola, 2003) nor does it attempt to measure the possible benefits of the diffusion of ICT technologies in societies (Mansell and Wehn, 1998).

By extending interviews to a larger number of stakeholders such as end-users, this can provide different insights on the sector and the innovation process, but this would be beyond the resources available for this research.

Instead, the framework stresses technological and innovation aspects in a specific service context of m-payment systems. However, there is no claim that the results of this qualitative research presented here are representative neither of the overall pattern of innovation of the individual firms nor the ICT sector in the UK and India. The services examined in this research certainly do not encompass all the innovative activity in the sector, nor does it account for the total number of formal and information interactions related to knowledge, learning and innovation.

It is also important to mention that although there is a substantial use of data generated for purposes inside the specific sectoral framework, the direct evaluation of the impact of these policies are not a direct objective of this research. Naturally, by examining the characteristics of the innovation activities in firms and their interactions with other firms in the sector, this research should contribute to the analysis of how policies induce knowledge and learning mechanisms as well as how vibrant this specific innovative service can be sustained and promoted. However, there is no intention to quantitatively measure this impact or the cost of effectiveness of the resources allocated.

1.5.4 Chapter Outlines

This dissertation is organized into eight chapters. **Chapter One** provides an outline for the need for the research. Broader academic and specific opportunity evident in the field are presented and summarized. The overall research paradigm is highlighted followed by an outline of the chapters. **Chapter Two** is the first of two literature review chapters. It presents key issues emerging from academic literature and its significance in regards of research implications. Consideration is especially given to sectoral system of innovation while introducing the concept of ideas space and applying it to m-payment SSI framework in addition to discussion on business models. **Chapter Three** is the second literature review chapter where it focuses on

service innovation and the innovation process. The chapter then refines the context of the study towards m-payment systems in both a developed and developing country while also discussing the theoretical framework of the overall research. **Chapter Four** discusses the research design and approach as well as the rationale behind the process. It outlines the key decisions behind the research strategy, the limitations of using the methodology and the ethical issues by means of the particular research approach. **Chapter Five** presents the first of two discussions and interpretations of the data. This chapter presents data specifically related to the SSI system as well as business models. **Chapter Six** is the second of two discussions and interpretations of the data. However, this chapter specifically discusses the emergent themes of the firms and cross-case analysis. **Chapter Seven** presents the analysis of the data to draw out key conclusions and contribution to knowledge. Finally, **Chapter Eight** summarizes the research, presents the contributions and gives recommendations to include both managerial and policy recommendations for future research.

1.6 Conclusion

This research contributes to international business, innovation and policy by investigating m-payment services and their competition across a developed country and developing country. The implementation of m-payment systems has the potential to affect development and economic growth rate of a developing country if it significantly enhances efficiency and extends the reach of financial services. There is evidence that is already accumulating in which e-banking and m-payments infrastructure are reshaping the structure and nature of the financial services industry (Isern et al, 2006; Allen et al, 2002; Claessens et al, 2002). Countries that are known as the so-called emerging markets are in the position of developing stronger financial infrastructure than those in more established countries.

By comparing the SSI and innovation process of m-payment systems between two countries that have had historical, political economic, social and cultural systems effects played out differently, this dissertation is done with the hope of offering analytic and theoretical insights that are movable across contexts. The research uses a multi-level framework synthesizing the SSI in m-payments with a procession

approach to m-payment innovation at firm level, derived from previous research. The next chapter, Chapter Two, will be the first of two literature review chapters. Chapter Two offers a review of previous research and literature pertaining to SSI whereas Chapter Three focuses on service innovation as well as discussing the conceptual framework of the research.

Chapter Two: Literature Review SSI and Business Models

2.1 Introduction

This chapter is the first of two literature review chapters. It brings together some significant contributions from the wide and diverse research literature on sectoral systems of innovation in the specific context of m-payment systems as well as business models. Rather than comprehensive, this chapter aims to contextualize the research within wider dynamics occurring inside the increasing technological capabilities and evolution of the sectoral industrial innovation systems in both developed and developing countries. In addition, the chapter introduces the thought of ideas space as a way of combating the danger of determinism in systems theory.

In spite of the significance of innovation to development, the meanings and dynamics of its occurrence remain implicit. One of disciplinary aspect of this research is to investigate the diversity of SSI and how the system affects business models in a specific service of m-payment systems. The literature on innovation systems discuss organizational learning in key actors, the differences in institutions which range from macroeconomic policies to business practices, and how knowledge and technology can change the innovation aspect of a product or service. In the last few decades, innovation systems have gained in popularity as frameworks to analyze and compare countries and sectors in regards of their institutions, actors and knowledge base. Thus, this chapter mainly focuses on literature relating to SSI systems and business models arguing that at the conceptualization favouring discovery, a sustainable surplus are enabled and changed as the parameters of SSI alter. Thus, this review of literature will provide background in formulating the first main research question.

2.2 Systems of Innovation Approach

There are some academics that have considered the system of innovation to be an appreciative theory because it is based on historical rather than mathematical terms, thus, it is closer to empirical studies (Lundvall et al, 2002; Nelson and Nelson, 2002). However, the system of innovation concept does not provide a formal theory which can identify causal links or specific propositions between a firm's innovation performance and a set of determinants (Edquist, 2005). Others have suggested that

the system is not a theory, but instead a conceptual framework that identifies a large variety of factors which impact innovation (Edquist, 2005; Howells et al, 2003).

The technical approach to systems of innovation is useful since it treats the system being open rather than being closed. Whereas, by definition, a closed system does not exchange anything within the environment, but acquires equilibrium; an open system is essentially opposite. The open system exchanges information and energy with the environment where the more exchanges that happen or occur, the greater the open system moves away from equilibrium (Jackson, 1991). These systems are characterized by qualitative as well as structural fluctuations (Saviotti, 1997) with key influence on the approach being the evolutionary theory of economics (Malerba, 2004). This considers the system to be open, dynamic, undergoing transformation and having innovation processes (Banathy, 2000). Other characteristics include actors, or agents, who have the ability to learn and gain further knowledge are able to demonstrate rational behaviour that is influenced by their past experiences and cognitions. Moreover, this contributes to a transformation of the environment (Breschi and Malerba, 1997). Agents, though, use their past experiences, cognitions and capabilities in order to gain new knowledge where they can take advantage of opportunities and contribute in some way economically to the system.

The innovation system is rooted in interactions between elements that come together towards a common outcome; and in this case the outcome is innovation, thus, the innovation process. The system considers factors such as boundaries, external links, and implicit rules and norms that govern social interaction (Lundvall, 1992). Furthermore, much of the emphasis on what determines innovation is by learning based on routine activities of production and distribution. Thus, the inputs in creating the systems construct outputs; and at times these outputs become new technological goods or services. These activities, though, are not necessarily motivated by the aim to innovate. A more narrow definition of system of innovation examines actors that deliberately generate knowledge for innovation (Nelson, 1993). These actors are considered the main source of innovation through their interactions. Moreover, determinants of innovation focus on activities motivated by the intention to innovate.

Innovation is, primarily, the creation of new knowledge or the blending of existing knowledge in new ways (Freel, 2003). It is concerned with learning as a social process, especially when one deals with transferring and accumulating tacit knowledge (Howells, 1996).

Evidence from previous research has suggested that systems of innovation differ depending on industry sectors (Malerba, 2002, 2005). Different industries use different sources of information in order to innovate by tapping into different sources of knowledge. There are some industry's innovations, such as biotechnology and telecommunications, which are heavily based on scientific and technological research. Firms in these industries are very likely to engage in in-house research and development (R&D) and cooperation activities with universities (Godoe, 2000; Riccaboni and Pammolli, 2003). Other industries are less likely to base their innovation activities on research and their main source of knowledge is from learning that occurs during routine activities of production and distribution or through the embodiment of new components and machinery developed elsewhere (Malerba, 2005). Therefore, a sectoral system of innovation is heavily focused on learning and knowledge where it is linked through interaction and through competition as well as selection in market activities (Edquist, 1997). However, sectors and their technologies differ from each in regards to the knowledge base and learning related to innovation. In addition, because of their differential capabilities, firms absorb and utilize knowledge at varying degrees (Malerba, 2005). This suggests that firms hold unusual characteristics at the firm level.

The evidently holistic nature of using the systems approach to innovation has advantages and disadvantages. The advantages are the approach lends itself to a wide range of theoretical and empirical studies. Research has been conducted across a variety of disciplines, and contributions stem from economic as well as in areas of management and business studies (Fagerberg, 2005). The disadvantage is that the approach has little operational value. The system is complex which makes it difficult to implement from a policy perspective as well as from a quantitative view (Edquist, 2005; Fischer, 2001).

2.3 Sectoral Systems of Innovation

The boundaries of an innovation system are perspective dependent and several systemic ways of looking at innovation have developed as subsets of the innovation system literature. Initial work has been focused at the national level, known as National Systems of Innovation (NSI) (Freeman, 1987; Freeman and Lundvall, 1988). This is in many ways an obvious boundary because it encompasses regions within a set political border, and nations have both the capability and mandate to formulate distinct policies and regulatory frameworks designed to inspire and guide innovation.

A research that takes influence from the SSI approaches needs to address the issue of how broadly or narrowly the concept of the system is defined. A narrow definition takes a smaller set of product groups and/or agents within specific levels of either individual firms, departments within firms, or groups of firms together that focuses on only specific relationships in a sector; whereas a broader definition focuses on all linkages among various components. This is conceptualized by Malerba (2005) who makes a key point that the choice of research whether it be individual firms, departments within firms or groups of firms really depends on the goal of the research. By using the SSI perspective of the firm, resources and capabilities are used to create customer value and competitive advantage (Barney, 1991; Peteraf, 1993; Prahalad and Hamel, 1990; Wernerfelt, 1984). The SSI approach recognizes that individual firms within a sector can have commonalities as well as be heterogeneous; and within sectors, firms co-evolve based on common goals (Malerba, 2004). Additionally, Malerba (2004) noted that sectors tend to differ based upon sources of innovation.

As Malerba (2002) points out, the elements and structure of SSI include: products, agents, knowledge and learning processes, basic technologies, mechanisms of interactions within firms and outside firms, processes of competition and selection, and institutions. All of these characteristics interact with each other in order to formulate the system where elements come together to develop the whole character of the system.

Following Freeman and Perez's (1988) suggestion that some configurations of institutions more suit innovation, Lundvall (1992) argued that a central activity in the system of innovation is learning, and learning is a social activity that involves interaction between people. However, systems approaches have two dangers: drawing the system boundaries and establishing causal relationships; especially difficult in social systems. Breschi and Malerba (1997) argue that grounding particular moments of technological and market opportunity, while in the actions of people, is the best protection against systems being deterministic or merely descriptive. Additionally, as Saxenian (1994) Nelson and Rosenberg (1993) and Carlsson and Stankiewicz (1996) dispute, establishing interactions between system-levels such as SSIs and its firms, requires auditable causal relations.

Other models to consider include triple helix, socio-technical constituency and actor-network theory; yet each of these models have weaknesses or limitations which only favour usage of a sectoral system of innovation approach. For instance, the triple helix focuses on how the university can play an enhanced role in innovation for increasingly knowledge-based societies (Etzkowitz and Leydesdorff, 2000). This model pays attention to the relationship between university and industry, but ignores the firm level perspective which is the basis for this research. In regards of socio-technical constituency, although it focuses on specific technologies and how ensembles of institutions interact with each other to develop such technologies, this perspective is more absorbed on a national level, not sectoral level (Molina, 1990). Actor-network theory, understood as networks of heterogeneous actors who formulate a network, is only stable so long as all human and non-human actors remain faithful to the network; thus it is more focused on the interactive process of organizations and ignores the innovation process as well as utilization of business models and knowledge creation (Whittle and Spicer, 2008).

Innovation systems are a way to look at complex systems to help understand how some economic systems excel and are able to harness new technologies. Therefore, adoption of sectoral systems of innovation approach for this research on mobile

payment systems will consider the role of actors, institutions and interactive learning and knowledge in how innovation is implemented.

Sectoral innovation analysis is a broad, flexible and adaptable tool that enables both qualitative and quantitative comparative analysis across industries, countries and regions (Malerba, 2009). SSI may differ from technological innovation in that the latter focuses on generic technologies that may be used across several sectors or industries; and may not be in direct competition (Carlsson et al, 2002). The scope or definition of a sector may be broad or narrow, depending on the goals of the analysis or level of aggregation (Malerba, 2002).

2.3.1 Institutions

Institutional theory explores how organizations can increase their capacity to grow and survive in a competitive environment (Jones, 2001). It conceives that firms are influenced by their social or institutional environment. The theory proposes that certain social environments take on a rule-like structure (DiMaggio and Powell, 1983). Thus, it provides the basis for explaining how social environments influence organizational action, or their innovation.

There are two broad types of institutions according to Edquist and Johnson (1997): formal and informal. Formal institutions have a more visible and codified existence; whereas informal institutions can be indirectly observed through the behaviour of people and organizations. Institutions provide incentives and can help influence innovation, but they can also act as obstacles due to their stabilizing effect in the system (Edquist and Johnson, 1997).

Scott (2001) concludes that institutions can be divided into three pillars: regulative, normative, and cognitive. Geels (2004) adds by saying that regulative examples are formal rules, laws, incentive structures, standards and procedures. Normative are the norms, values, role expectations, duty, authority and codes of conduct; whereas cognitive are common believes, shared logic of action, priorities, and beliefs (Geels, 2004). The actual roles of institutions, though, are not just to maintain inertia or stability. Institutions are one of the essential components and it explains the

interactions between actors and other elements of the sector (Geels, 2004). However, for both Scott (2001) and Geels (2004), their work is mainly theoretical or conceptual in nature. Thus, it is not supported by empirical evidence or analyzed by the researchers themselves.

2.3.2 Actors

Actors, or agents, within the SSI include firms, users, suppliers and non-firm organizations, but firms are central to the creation, adoption and usage of knowledge and technologies (Teece and Pisano, 1994). In turn, these firms are influenced by their beliefs and competences (Dosi et al, 1998). Essentially, firms are heterogeneous because of their different capabilities (Nelson, 1995); whereas users and suppliers have their own capabilities (Lundvall, 1992). Non-firm organizations include financial institutions, universities, government agencies, local authorities or other business associations (Malerba, 2005). Actors do not operate in isolation, but are interconnected and form the structure of the SSI (Lundvall, 1992; Edquist, 1997). Thus, innovations are triggered as a result of these interconnections and interactions.

2.3.3 Knowledge and Learning

The sector transforms by the type and dynamics of demand as well as links and complementarities among sectoral activities (Breschi and Malerba, 1997; Malerba, 2004). As previously mentioned, sectors differ from each other, but, specifically, in knowledge and technological opportunities (Freeman and Soete, 1997; Rosenberg, 1982) which can change the sectoral activities. Key characteristics of knowledge are accessibility and opportunity, and cumulativeness (Nelson and Winter, 1982). Accessibility may be at varying degrees for external knowledge (Malerba and Orsenigo, 2000). Knowledge, though, relies on cognition shaped by past experiences and learning processes.

Within systems of innovation, there is a lot of discussion on learning in knowledge generation. Learning within this definition includes the idea of searching and exploring activities, but learning is defined differently from the concepts of searching and exploring. Learning leads to incremental innovations and influences the cumulative path and direction of the innovation along existing lines of development.

This learning and knowledge depends on institutional set-up. Institutions are understood to be sets of habits, routines, rules and laws that regulate the relations between people which shape human interaction (Johnson, 1992).

Firms generate technology advancement through learning from collaborative relationships with partners such as suppliers (Mabert et al, 1992), customers (von Hippel, 1988), competitors (Gomes-Caseres, 1996), and research communities (Henderson and Cockburn, 1994). The relationship between suppliers and the focal firm is long-standing with extensive transactions and interactions, yet, it involves relatively little formal technology transfer as compared to other forms of inter-firm collaborations (Child, 2001). Lundvall (1988) characterizes it as an informal exchange and sharing of knowledge resources with suppliers and/or customers that is conductive to innovation of the firm as interactive learning. Although the extent that firms learn from their suppliers depends mainly on the capability of the suppliers and how effectively the firm manages the innovation process so that capability can play an important role.

In the interaction with customers, the learning process may take place in two stages of innovation; customers take on the role as the co-developer in the product design stage and the development stage. While firms innovate and develop solutions in what can be called an artificial testing laboratory, customers operate within a figurative natural testing laboratory as they experiment with a product in its natural environment (von Hippel, 2005), yet, in most cases, customer knowledge is not enough for successful innovations. Information from customers offers a better understanding of the relationship between a product's design and its performance. During the development stage, firms can learn to determine the performance and maintenance characteristics of a new product because of feedback from customers who have extensive experience with the product, or what Rosenberg (1982) calls "learning by using." By interacting with customers, this may result in new knowledge that can lead to new performance or operating practices for firms and their products.

Innovation and any other adoption-related activities tend to be based more on real world aspects whereby "learning by doing" is the norm (von Tunzelmann and Acha, 2005). Furthermore, another dimension, learning orientation, is core in relationships with other innovating firms. Keskin (2006) found that a firm's learning orientation influences the ability to innovate in a positive way while, in turn, learning orientation is positively influenced by market orientation. Yet, Guo and Guo (2011) have found that learning processes and learning opportunities are influenced by firms in four factors: complexity of technology in the sector, the interconnectedness between product and process, path dependency of knowledge searching, and incremental technological development within the sector.

2.3.4 The UK Sectoral Systems of Innovation

Historically, systems of innovations have focused on comparing national systems across a range of countries; mainly focusing on developed countries (Freeman, 1995; Nelson, 1993). From these studies, there have been two main contributions describing the UK system of innovation. Freeman (1995) argued that the UK was overtaken by the US and Germany in electrical and chemical industries from the 1950s onward not because the UK lacked invention capacity in research, but it lacked the brains behind the initial ideas. The UK was not able to diffuse scientific knowledge and apply it to use within firms (Freeman, 1992). Thus, Freeman's perspective suggests that the performance of the UK system of innovation is heavily influenced by the transfer of knowledge between science and technology. This knowledge transfer, in turn, depends on the extant of the linkages between companies and research as well as the capabilities of companies to adopt and translate this knowledge that leads to the application of new products or new production processes.

The other contributor to UK SSI has been Walker (1993) who argued that the UK system is shaped by the influence of a dominant service sector, specifically the financial and insurance sector. It is associated with relatively low expenditure on firm's R&D where proportion of it derives from foreign multinational firms. Driver and Moreton (1991) found that uncertainty in the macro environment leads to lesser

investment; such as R&D investment. Thus, Walker (1993) finds evidence that UK firms were increasingly engaged in cooperation with European based firms where knowledge was generated in order to be innovative. From what emerges from these two studies, Freeman (1992) and Walker (1993), is the importance of knowledge transfer and the relationship between science, technology and firms in the UK system of innovation. There is some evidence that points to an increase in cooperation activities.

2.3.5 Developing Countries' Sectoral System of Innovation

Most sectoral innovation research has, up until recently, been mainly from developed countries (Malerba and Mani, 2009), but there is growing interest in understanding how to apply the innovation system framework to improve policy and strengthen innovation in developing countries (Aorcena and Sutz, 2000; Aubert, 2005; Chaminade and Vang, 2008; Malerba and Mani, 2009). Recently, researchers have shown that there is at least a need to assess to what degree the original concepts around innovating systems from developed countries apply to developing countries' context (Srinivas and Sutz, 2008; Chaminade and Vang, 2008; Lundvall et al, 2009). Others have also explored the difficulty of developing technological capacity in emerging economies. For example, the transition dilemma between the 'catch-up' phase and true leadership is explored by Hobday et al (2004), who describe how firms and sectors move between these stages. Ernst (2002) has explored the innovation systems of developing countries by studying the international networks that allow the import of mature technologies for reverse engineering. The key similarity between all of the frameworks described above is that the focus is on how latecomer firms to a field become involved in the eventual creation of new knowledge.

Perez and Soete (1988) believe that certain technologies, or certain stages of a technology's development toward maturity, present developing countries with 'windows of opportunity' to catch up (Perez, 2001; Perez and Soete, 1988). These windows of opportunities may be influenced by a number of factors including through the creation of appropriate institutional frameworks, government policies

and skilled human resources (Niosi and Reid, 2007). Whereas McHaon and Thorsteinsdottir (2013) see how new wave technologies may differ from more traditional sectors with respect to the capabilities required for innovation. Thus, these new technologies may require greater R&D and patent intensity, strengthening of the knowledge base and greater linkages to users (Mytelka, 2006).

Most of these models mentioned above are designed to describe the characteristics of innovation strategies for developing countries to catch up with more industrialized countries during a specific period of time; largely in the electronics and manufacturing sectors. There may be less room for countries to engage in the old models of technological catch up now (Lundvall et al., 2009). Reverse engineering and imitation based strategies that were the stepping stone of the so-called Asian Tigers are now impaired by stronger patent rules, greater fiscal prudence, and the removal of international trade barriers (Lundvall et al., 2009). Fortunately for emerging economies and other developing countries, there are multiple generic evolutionary paths for rapid tech catch-up (Wong, 1999).

2.3.5.1 Indian SSI

India is part of the so-called BRIC countries. First coined by the economist O'Neill in 2001, the BRIC acronym refers to the countries of Brazil, Russia, India and China. These countries are increasingly run as global market economies. India is one of the largest economies in the world and with over one billion in population; it represents lucrative and diverse opportunities as well as high prospects for growth and earning potential for businesses and firms.

In India, the government has historically played a major, and in most cases, a singularly positive role in the formation of its innovation system. Ever since its independence from British rule, India has invested much time, resources and efforts in creating a knowledge society and building institutions of research and higher education. Nevertheless, India is faced with major challenges related to infrastructure and bureaucratic hurdles.

India's SSI has mainly been focused in the telecommunication industry. In the 1980s, the Indian government created the Centre for Development of Telematics (C-DOT) to mandate the design and development of digital exchanges. C-DOT is, in essence, a public laboratory. While the lab has been successful in not just generating technologies that are suited to Indian conditions, it has been able to effectively transfer the generated technology to a host of public and private sector firms. The laboratory is credited with establishing a modern telecommunications equipment industry in the country (Mani, 2007).

The drawback of C-DOT has been that firms did not have their own in-house R&D centres and were dependent entirely on the technologies that they received from the public lab. Furthermore, the lab failed to take cognizance of the future in mobile communications unlike its Korean counterpart. The net result was that the licensing firms became too complacent with respect to their own capability building.

The presence of institutional factors is well documented within the Indian economy. There are various government funded institutions, especially educational for both the engineering and the management sectors. These institutions have produced world class graduated who have fuelled the international growth of the software industry by enabling Indian software firms to capitalise on the readily available pool of talented and comparatively cheaper software programmers that are the crucial human resources required by software firms. The abundance of highly skilled and comparatively low-cost labour pool has enabled a sustained form of competitive advantage for software firms and technology firms to compete in the global market.

2.4 Ideas Space

With their genealogy in Hughes' (1984) technical networks and Malerba's (2002) technological systems, SSIs can be interpreted as underplaying the importance of innovators and their learning. Social-learning theorists such as Wenger (1998) argue that learning is a social sense-making process. This can be interpreted as new learning that aligns or disputes older learning, using conceptual frameworks developed over a life-time in interacting in society. One of the major critiques of the

mind-in-the-head, behavioural or non-social learning view of human learning developed by Clark (1997), is that one accesses learning external to the mind, knowledge that is embedded in social structures; in effect, metaphorically, social networks think for people through an extended mind that reaches outside of our heads. In what Ogle (2008) calls "ideas space," this is akin to a paradigm, except that paradigms guide thinking within parameters, whereas ideas space includes boundary hopping ideas, allowing re-combinations of knowledge between paradigms. Thus, ideas space is a community of practice where argument can be made that in a technology sector, the population of which includes people from diverse disciplines, bringing new ideas and models into what were fixed technological paradigms. To paraphrase Ogle (2008), vibrant SSI containing ideas spaces reveal, rather than conceal.

Figure 2.1 below represents an m-finance SSI. It is used as a framework to map and analyse the m-finance sectors in the UK and India. Linking the supply and demand aspects of the SSI is habitus, which is shorthand for particularly British or Indian culture and ways-of-working aligning production and consumption.

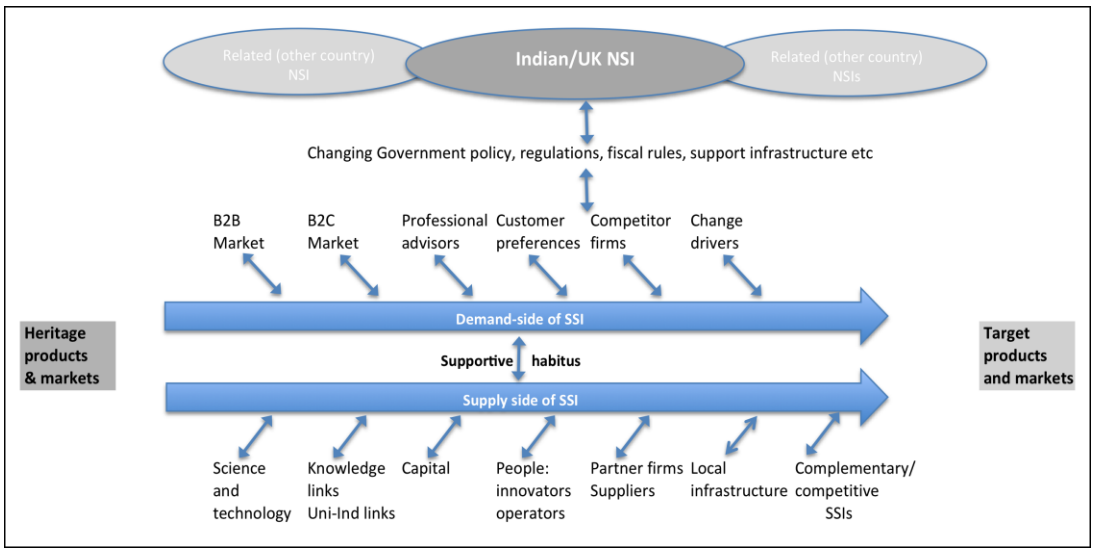

Figure 2.1: Conceptual Representation of SSI

Supporting and shaping the SSI is an array of supply and demand, social and technical factors: the more social to the left and more technical to the right. The demand side is revealed to begin with business-to-business (B2B) and business-to-

consumer (B2C) markets showcasing their size and trajectories, the availability of professional services such as accountancy, design, marketing, lawyers, and competitor firms in addition to the intensity of competition. Change drivers suggest NSI and macro-economic factors influencing the SSI.

Geels' (2004) SSI model emphasises their dynamic nature and interaction with NSIs and market environments, yet remains an abstract mapping tool. Alternatively, Figure 2.1 represents, conceptually, a snapshot of a SSI capturing its demand and supply influences and characteristics that are both social and technical in both India and the UK. Of course, these are not watertight compartmentalisations; all SSI feature trade-offs within tensions, alignments and compromises between constituent parts and trajectories. At the centre of the SSI are people such as leaders, researchers, decision-takers and operators who occupy the ideas space envisioning and directing SSIs. Arrows between the ideas space, SSI, NSI and business environment indicate how these systems mutually shape, influence, constrain and enable the other. In each quadrant, examples are given of factors enabling or disabling the ability of the SSI to innovate (Lundvall, 1992; Geels, 2004).

Figure 2.2 below, intermixes ideas space and begins with the science and technology available to the SSI, followed by the sources of this knowledge and the SSI's ability to exploit the knowledge. Particularly important here are university-industry links because this sector is at the cutting edge of science-technology development. Also important, as Herrmann and Peine (2011) stress, are the right mix of leadership, scientific labour and operator level labour, and the supply of resources being capital in all its forms, including state aid. Cross-fertilization of ideas between foreign direct investors (FDIs) and indigenous firms, either via supply contracts or staff mobility (Østergaard et al, 2011) is shown to be significant. Thus, the issue of evolving standards suitable for British/Indian and international markets and the processes of arriving at decisions on standards, is of crucial interest to the SSI and one of its important interactions with its own and other NSIs.

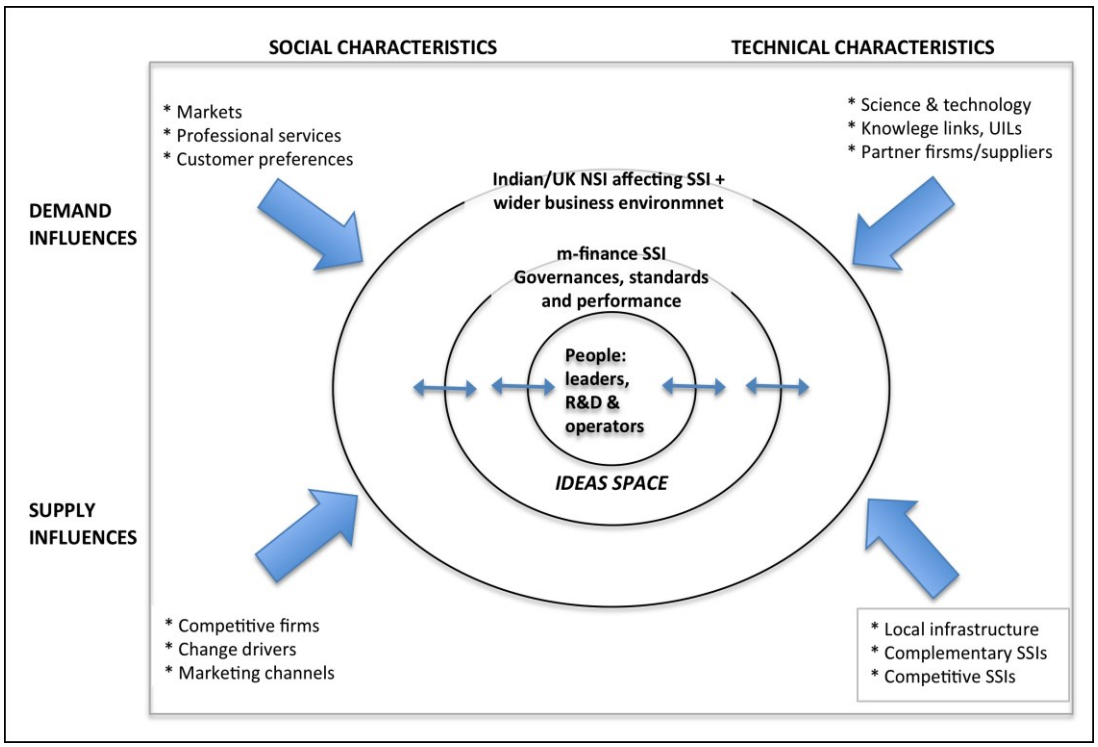

Figure 2.2: Institutions and Components with their Inter-relationships Constituting the M-finance SSI

As SSIs evolve, power shifts as new knowledge is exploited. Ahonen (2006) illustrates this for m-services, illustrating how location-based services; micro-payments and Web-2 social networking have redistributed power and value within the sector from device manufacturers, to network providers and now to platform providers. For m-payment systems, Ondrus and Lyytinen (2011) discussed many actors involved in the service delivery process, whereas Mas (2011) actually proposed a reduction of actors to include only cash merchants, corporate or bulk users and end-users. For Mas' (2011) framework, cash merchants see an opportunity to make money by reselling mobile money in exchange for cash on demand. Corporate or bulk users are actors who make payments to many people; and end-users are people who keep money in an account and occasionally transfer some to others (Mas and Radcliffe, 2011). Thus, in this framework there are two demand-side actors, corporate or bulk users and end-users, and one supply-side actor, cash merchants. However, absent from this framework are the telcos who are vital within the system. Even previous literature supports the important role of telcos in delivering the payment.

2.5 M-Payment SSI

Breschi and Malerba (1997) defined SSIs as a supply side technological system; whereas later work such as Geels (2004) views SSIs as composed of both supply and demand institutions. From this perspective, SSIs have social and technical parameters such as markets, user-stakeholders, university-industry links and sources of risk capital; these alongside R&D become change drivers, though the footprint and governances of each SSI depends upon context and spatial reach.

There are 15 key variables (numbered in small circles in Figure 2.3) influencing innovation and detailed in Table 2.1 below. The assumption to be tested is that Clemons (2009) is correct in arguing that advertising plays little role in effective m-finance business models since customer neither trust, want or need unwanted referrals, especially when deliberately misdirected to wanted sites.

1	Solution: the service offer (virtual, physical or information productions) such as P2P payment, or payment for goods: not the connection to business leadership
2	Institutional thickness (Amin and Thrift, 1995) or institutional voids (Khanna and Palepu 2010) enabling/inhibiting m-finance, such as the availability of a banking network to target customers
3	Complementarily arrangements to m-finance such as Internet penetration, 3G availability and connections into the relevant science and technology base
4	Customers, how they segment (high value or low cost business models) and how the firm competes with competitors – strategy
5	Basic connectivity, user-provider interactivity and the agility of the firm to respond to opportunities
6	Scale and scope: range of services, volume of target provision
7	Key governances and standards impacting on m-finance design and delivery, banking and telcos governances and operations
8	Price/income choices such as ARPU maximisation or high-volume low margin services
9	Costs, cost-sensitivity of the firm and who bears cost within the ecosystem
10	Viability of business model: can the firm trade at a profit and who is bearing what risk?
11	Over time, is it likely that the business model and firm can be disrupted?
12	Over time, are changes in markets, technology or regulation opportunities or threats; such as the impact of cloud computing?
13	Over time, should the firm's strategy be exploitation or exploration?
14	Over time, are the firm activity learning, exploiting R&D and evolving dynamic capabilities to remain competitive?
15	Over time, is the firm capable of sustained innovation necessary to be a sustainable business, including altering its business model?

Table 2.1: Fifteen Variables in Analytical Framework

Table 2.1 represents an analytical framework, bringing together the dimensions of an m-finance SSI (Figure 2.2) with the business model choices facing the m-payment

firm as well as the variables for Figure 2.3. Note the firm is an actor in a m-finance value-system any particular SSI. Depending on power and value-flows (Castells and Himanen, 2002), the key actor can be a bank, network, ISP, platform, application and/or device manufacturer. The firm can be indigenous (targeting international and/or local markets), inward investor or some form of joint-venture. Solution service offers can be narrowly focused or cross the spread of 5-**M**'s: **m**ovement; **m**oment; **m**e (communities); **m**oney and/or **m**achines (device fusion) suggested by Ahonen (2006).

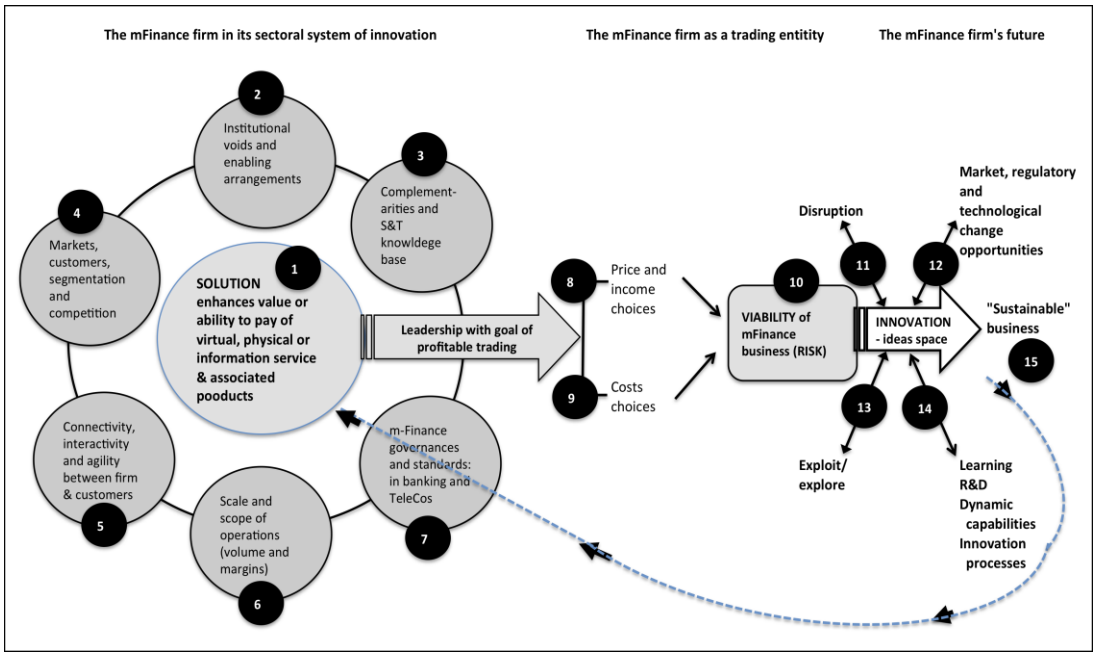

Figure 2.3: Framework – the M-finance Firm Trading in a SSI

If one were to take variable 7, the key governances and standards impacting the firms, this is going to influence the leadership goals of the firms as well as influence the price and costs choices. Key governances and standards is a variable because in the m-payment SSI, acceptance of governances by all agents is crucial to success. It has a trickle effect within the SSI. If, for example, device or network providers opted for 'commons' governances as opposed to 'market' governances, the SSI breaks down. Similarly, technological complementarities and standards compliance are crucial for the system to work. In addition, SSIs feature modes of operation, particularly social, market and temporal contexts plus interactions amongst these systems. For Scott (1995) types of rule-making powers are important; regulative or formal, normative

and cognitive intellectual paradigms, especially if SSIs conflict or conflict occurs within the SSI; examples being between networks, banks, and platform and application providers. Governances set boundaries in which firms, individuals and organisations operate; what Kay (2004) refers to as disciplined pluralism, outside the loose ties of which actors cease to be SSI participants. Indeed, as SSIs innovate, their composition and governances are likely to enter phase transitions or tipping points (Gladwell, 2000) towards embracing new technologies and markets. Within each country, SSIs may attract special government attention for reasons of security or national prestige, especially when techno-nationalism (Stevens 1990; Ostry and Nelson, 1995) is influential, such as in R&D support for public-private sponsored innovation.

If one were to take variable 14, then one would be analyzing the SSI learning as well as the dynamic capabilities for the firms within the M-finance system in order to discover if the firm is competitive. Variable 14 is chosen because it conveys the competitive nature of relationships within the SSI and between SSI outcomes. Without competitive innovations, eventually a SSI is disrupted by a service solution better in meeting customer needs. When SSIs become locked-into disrupted technologies, the entire SSI is challenged to learn and change or, simply put, fail. Learning, innovation and the creation of dynamic capabilities is then crucial to the success of the SSI. Burns and Flam (1987) use active agents, especially cognitive beings, as examples of being critical to any socio-technical regimes because it is they who learn and exploit learning. Thus, SSIs have intended and unintended outcomes. For example, the iPod led to a regime for digital sales of DVDs, books, apps, and 250 million online paying customers. Bourdieu's (1971) work offers one way of introducing active agency into systems using the idea of habitués which is the social glue that explains predispositions, without being deterministic. It explains through the usage of evolutional metaphor why behaviours are transmitted, whilst allowing variation which results from people not accepting cultural predispositions.

Therefore, Figure 2.3 combines aspects of SSI and how ideas space can be relevant for future scenarios of m-payments. The figure begins with a simple m-payment

solution where institutional voids and knowledge understanding create a specific market. A market will create different consumer segments where regulations are instituted. At this point, a firm does not know if the service is profitable, thus, firms have to decide price and cost choices as well as what can the consumer afford. It becomes a risk for all firms involved in m-payments. Therefore, in taking the concept of ideas space, firms, at this point, can disrupt, change technological and market opportunities, and/or continuing learning with knowledge exchanges. However, at the end, it is the hope that the firm will create a sustainable, profitable business.

2.6 Business Models

A business model is a schematic, simplified representation of choices around how businesses create and distribute value amongst stakeholders. Externally represented to customers in the form of a perceived value proposition, the business model is the internal, or detailed, encapsulation of a business plan, including service, or product, touch-points, market, operations, capital, risk and people. Business models are more than a metaphor or narrative; they guide practical actions. Nor are they unchanging recipes since successful business models will evolve with environments and opportunities: new combinations of customer solutions and business models constantly emerge recombining the application of learning as technology and markets change. At the heart of a business model are costs, sales/price and margins, thus, a business model predicts profitability. Wise business leaders, Baden-Fuller and Morgan (2010) argue, continually conduct thought experiments tweaking the business model. For Teece (2007), the business model is best conceptualised as a framework, or what Zott and Amit (2007) call an activity system intermediating between supply and customers, within which a particular model is always provisional. This is especially so in services, as Normann (2002) points out, where customer experiences are subjectively experienced.

Business models are best re-evaluated and altered in light of changing technologies and market opportunities; in short as business leaders learn. The danger as Amit and Zott (2001) point out is that once choices are exercised, they become a logic or mindset (Dweck, 2006) which inertia, insularity or perceived success make difficult to alter; ties that bind, also blind (Granovetter, 1973). This dynamic view of business

models is favoured by Chesbrough (2010) who argues that dominant logic can narrow scanning and search for new solutions, and McGrath (2010) suggests a discovery approach; for example evolving business models. Demil and Lecocq's (2010) conclude that business models can be static or transformative. On-going businesses require both stability and change to prosper and may, for periods, run with multiple business models (Smith et al, 2010) provided levels of learning are high, customers can be segregated and autonomous delivery teams empowered.

Several authors comment upon business model change. Amit and Zott (2001) and Zott and Amit (2008), for example, draw attention to lock-in, complementarities and efficiency; however, this approach focuses on the causes or need for change, not on the change processes. Baden-Fuller et al (2010) use Lecocq et al's (2006) RCOV framework: relationship between resources and competences; organisation and value propositions to evaluate and promote business model change. Here, the emphasis is on aspects of the business model rather than the learning and its exploitation resulting in change.

In an otherwise instructive paper, Clemons (2009) argues that there are three e-commerce business models: selling artefacts, virtual goods or information. This is to conflate the business model with strategy when the latter is what differentiates a business offer as perceived by customers and the former the creation and distribution of value (Sanchez and Ricart, 2010). Of course, the business model and strategy must align, though not in the way that Casadesus-Masanell and Ricart (2010) argue analogising the former to a machine that is fit for purpose, yet unchanging. Neely's (2008) idea that model and strategy symbiotically interrelate is stronger, since it captures the evolving nature of business models as strategic opportunities to improve performance emerge.

Since the majority of business models, and businesses, now follow a service-dominant logic (Vargo and Lusch, 2004; 2008), service touch-points (Bitner et al , 2008) and user experiences will prominently feature in effective business models, as distinct from the goods-dominant logic found in much of the literature and in Amit and Zott's (2001) discussion of e-commerce models. Casadesus-Masanell and Ricart

(2010) usefully differentiate strategy from tactics in the application of business models; however, their focus on policy, assets and governances suggests a goods-dominant logic. While Teece (2010) argues that strategy will always be more granular than a business model since strategy presumes market segmentation. Although, this cannot be correct, since the business model too presumes a focus on a clearly identified set of users/customers. Williamson (2010), though, disputes that cost innovation such as frugal, Ghanaian, and jugaad is a disruptive business model deriving from emerging economies. In summary, business models and business strategies cover some of the same ground; however, it is important that they are conceptually and operationally distinct.

2.6.1 Mobile Payment Business Structure

For the actual payment process, there are specific stages where the business model is affected at every point according to Ondrus and Lyytinen (2011). The first stage is that strategic, inter-organizational alliances need to be formed. These alliances include the network operators and financial institutions forge partnerships to facilitate the delivery solution. As a unit, this is what Ondrus and Lyytinen (2011) term the newcomer who must proactively forge relationships with merchants and business intermediaries to strengthen its competitive position in the marketplace. They then must act as insurgents to generate awareness, attract customers and gain market share. The last process is where these novices must forge relationships with device and infrastructure manufacturers which are interoperable and permit scalable payment solutions (Ondrus and Lyytinen, 2011).

There are four main mobile payment systems transferring value from one person/location to another. SMS transfer of bank balances such as mPESA in Kenya is where the user sends a text message with a keyword and unique number to a premium short code receiving back a PIN with which to access content or services. Direct mobile billing like the Weibo or PayPal, is the password accessed debit or credit payment transfer or m-digital wallet deduction. A third system, mobile web payments (WAP) uses a prior authenticated app to draw down a credit card or e-wallet, or authorise the mobile operator to pay and recoup; these may be either Cloud

(e-wallet) or NFC connectivity, the latter requiring a special chip in the device. WAP is increasingly found in micro-payment ticketing and retail outlets.

Table 2.2 illustrates how across various e-Payment types, B2B, B2C, customer-to-government (C2G) and person-to-person (P2P), m-payment business structures are diverse and dynamic.

e-Payment type	Description	Firm Example
e-Shop	Brick and/or click virtual outlets	Amazon
e-Procurement	Tenders to supply: inlets	esourcingforum, ogc.gov.uk
e-Auction	Competitive bidding	eBay
e-Mall	Sellers' platform	Ten-Cent, Weibo
e-Marketplace	Comparison of online offers	Comparator sites

Table 2.2: M-payment Business Structures

The range of mobile Internet business models is even more diverse and dynamic. Funk (2009) suggests the following basic models: retail, advertising supported, subscription, download fees, affiliate marketing, software-as-service, brokerage and rewards. Models vary in the extent to which site providers exploit user information (Google, Tesco, Facebook). Additionally, these site providers charge consumers double-sided payments (e.g. e-recruitment), pay-and-play games, free access with advertising (Guardian) or in-service payments (Angry Birds), m-payment discounts (parking), and loyalty points (cafes, airlines).

2.7 Conclusion

This chapter has attempted to provide a framework for understanding the development of SSI in applying it to m-payment systems. By reviewing research literature on SSIs, this section has criticised some formulations of innovations systems as deterministic and inadequately theorising agency within institutional structures. This has led to the formation of the first main research question: how does a diverse sectoral system of innovation shape business models within the mobile payment systems? Figures 2.1 and 2.2 adapt the SSI framework to centrally feature human agency in the form of sector leaders, researchers, decision-takers and

operatives, located in a specific business and cultural context – the habitus in which m-payment systems and services are being innovated in the UK and India.

The concept of SSI is useful in understanding the competence of its elements and interaction among these elements as well as how the uniqueness of the system influences the business models. However, the framework of SSI still leaves specific vacuums that fail to show how SSI and competitive environments are related. Although the uniqueness of SSI provides limited scope for specific sector success among developed and developing countries, there appears to be similar paths of innovation. The next chapter, Chapter Three, is the second of two literature review chapters where literature concerning innovation process and service innovation will be presented as well as the theoretical framework of this dissertation.

Chapter Three: Literature Review Service Innovation

3.1 Introduction

This chapter is the second of two literature review chapters. The previous chapter, Chapter Two, focused on the sectoral system of innovation and effects on business models. This chapter is divided into four sections. The first section of this chapter focuses on service innovation. Specifically, it looks at how products are different from services, classifications of services and the development of new services. The second section reviews literature in relation to mobile services and mobile payment services. The third section presents the theoretical framework of the research. Finally, the fourth section focuses on identifying the research gaps.

In general, innovation means different things in different contexts. The meaning, nature and character of innovation are contextually specific. This research considers several aspects of innovation, but specifically services and how they interconnect. Given the complexity of the innovation construct, it requires a broad understanding of the service innovation models. The idea of newness, though, is conceptualized in several different ways in literature. Coopey et al (1998) sees innovation as a particular form of change characterized by the introduction of something new. However, the concept of new can be a recombination of old ideas so as long as the idea is perceived as new to the firms or customers involved it can be classified as an innovation although it can appear to be an imitation (Van de Ven, 1986). Zaltman et al (1973) endorses that concept of innovation and adds that innovation can be any idea, practice, or material artefact which is perceived as being new by whoever adopts or uses the innovation.

Overall, innovation can be distinguished on three dimensions: the type of innovation whether it is radical, new or incremental; the level as to where the innovation takes place such as macro versus micro, new to the world, the market or industry versus new to the firm or customer; and the business area affect by the innovation such as the market place, technology or both (Garcia and Calantone, 2002). Given that this research focuses on service innovation, it understands innovation as a valuable and useful new service in an organizational setting (Woodman et al, 1993). Moreover,

services are considered new when competencies that are different from the current operation need to be introduced in order to facilitate and adjust the service concept (Menor et al, 2002).

Increasingly, due to globalisation and advancement of technologies (Aharoni, 2002; Pavitt, 1984), services have been recognised as an important sector of the economy (Miles, 1994). Service innovation and the management of new service development (NSD) activities have attracted research attention from areas such as marketing, operations management, strategic management and information systems. Nonetheless, there is still a paucity of literature on service innovation and new service development, especially as compared with manufacturing innovation and new product development.

This chapter does not provide a comprehensive review on literature relating to innovation or all innovation in the service sector. Instead the chapter is trying to lead into discussion on, specifically, mobile payment services and the how the technology has led to a transformation within relationships between financial service firms and customers (Parasuraman, 2000) as well as a reduction in costs (Meuter et al, 2005) in order to answer the second research question. Thus, the aim of this chapter is to gain an insight into the innovation process of specific m-payment services. In particular, gaps emerging from these themes are identified in order to formulate the second main research question.

3.2 Service Innovation

The literature on service innovation has focused on the taxonomy of service innovation (Bettencourt, 2010; Voss and Zomerdijk, 2007), new service development (NSD) processes and activities (Froehle and Roth, 2007) and factors that influence NSD and service innovation success (Menor and Roth, 2008; Ordanini and Parasuraman, 2011). Defining innovation has been challenging to service research since studies have adopted several different definitions (Garcia and Calantone, 2002). Innovation, though, involves significant changes in the service (service concept), the production (service process) or delivery (the service system). Hence, innovation is

concerned with the introduction of a new service, the reconfiguration of a service, or the improvement of existing service (Miles, 1994).

A service commonly lacks a physical form to measure. Howells and Tether (2004) tackles this problem by suggesting that it is better to distinguish between inward or outward innovative activities. Inward innovative activities focus on the way that a service firm carries out its activities for a specific purpose like reducing cost; whereas outward innovative activities showcase how a service firm interacts with others like users, competitors and suppliers. Thus, a service can be a series of activities that involve relationships between the provider and the user. In majority of services, there appears to be high levels of interdependency as well as interaction between the service providers, the suppliers, and the users (Tether and Metcalfe, 2004).

Research on services is really attributed to the work of marketing scholars. Shostack (1977; 1982) introduced the molecular approach to modelling the product-service combination as the first step in designing, or as what he calls blueprinting, services. By the 1980s, the concept of the SERVQUAL marked an increased focus on service quality (Gronroos, 1984; Parasuraman et al, 1985; 1988). Recently, because of the idiosyncratic nature of services, research has focused on the life cycle of service products (Barras, 1986; Gallouj and Weinstein, 1997), the process of new service development (Kelly and Storey, 2000; Sundbo, 1997), and the performance of service innovations (de Brentani, 1989; Hipp and Grupp, 2005).

The level of innovation in service ranges from being totally new to discontinuous innovation of line extensions similar to what can be found in product innovation. Although, the degree of novelty can simply be represented by both sides of the innovation spectrum: radical or incremental. Yet, previous academic research use different degrees of the innovation to categorize the different types of service innovation. For instance, Lovelock (1984) categorizes innovation into six major types: major innovation, start-up business, new for the present market, service line extension, service improvement and style changes. Similarly, Gallouj and Weinsten

(1997) divide service innovation such as: radical innovation, improvement innovation, incremental innovation, ad hoc innovation, re-combinative innovation and formalization innovation. Additionally, Jong et al (2003) argues that radical innovation is usually developed in stride with large-scale and formalized progress as seen in the manufacturing industry. In contrast, incremental is, often times, developed using a less formalized progression and less large-scale change. Therefore, innovation in the service sector frequently belongs to the incremental innovation and is developed by different actors and suppliers who are involved in the development of a new service.

Of the different perspectives discussed above, the importance of these standpoints is that innovation in the service sector can be triggered either by different actors, suppliers, the service firm and/or the user themselves. Additionally, no matter who triggers the innovation, they all play different roles in service innovation. Originally, services have been thought of as being technological laggards with low productivity gain and limited innovative activity. Indeed, there has been a shift in thought about services from asking if they actually do innovate to how do they innovate and which services are most innovative (Miles, 2001). Yet, trends have shown an increased integration between manufacturing and services, and convergence between technological and non-technological innovations (van Ark et al, 2003; Howells, 2006). These trends, though, are implications that such shifts are further enlarged by the global character of services and the outsourcing trends (Howells, 2006). In general, there has to be a distinction between products and services which will be discussed below.

3.2.1 Products versus Services

Service innovation research is, increasingly, being justified in terms of the dissimilarity from product or manufacturing. Four dimensions characterize the differences of products and services: tangibility, separability, heterogeneity, and perishability (Atuahene-Gima, 1996). Services are, therefore, intangible because they are difficult to evaluate and assess before consumption takes place as well as difficult to protect from imitation (Sundbo, 1997). Inseparability describes the concurrent

production and consumption of services. Thus, this implies the necessity of and prospect of close connections between personnel and consumers in better understanding customer needs. Heterogeneity is the variability in the quality of services being offered. Lastly, perishability describes the aspect that services, unlike products, cannot be stored which leads to problems in matching supply and demand (Atuahene-Gima, 1996). Grönroos (2007) compared goods and services from several perspectives as shown in Table 3.1 below.

Products	**Services**
Tangible – a thing	Intangible – an activity or process
Production and distribution separated from consumption	Production, distribution and consumption simultaneous
Homogenous	Heterogeneous
Core value produced in factory	Core value produced in buyer-seller interactions
Customer do not (likely) participate in production	Customers participate in production
Transfer of ownership	No transfer of ownership

Table 3.1: Products versus Services Dichotomy
Source: Grönroos (2007)

Typically, in literature that focuses on physical goods innovation, research and development (R&D) is used as a key predictor for innovation because of their role in protyping and new materials procurement (Sher and Yang, 2005). However, such activities of R&D are not typical in services, since, by nature services are intangible (de Jong and Vermeulen, 2003). Thus, very few service firms employ R&D department (Tether, 2003) because outcomes of R&D spending are not available for intangible processes (Sher and Yang, 2005; Tellis et al, 2007). Therefore, R&D is unlikely to be an appropriate predictor of innovation in services.

Much of the literature does not distinguish between products and services, and, at times, are used interchangeably. Compared to products, or goods, services are intangible and are consumed when produced since they cannot be stored for later use (Fitzsimmons and Fitzsimmons, 2006). Further, previous research used characteristics of sectors to describe the innovation form, the innovation approach and the technological orientation to contrast this from manufacturing to services

(Fasnacht, 2009). However, there is limited knowledge in regards to the extent that processes applied to developing new products in manufacturing sectors can be applied to the service sector as well (Tidd et al, 2005).

In regards of the classification differences between products and services, services can be innovative. This section has been detailed in distinguishing products from services. The next section will focus on how services become new or are innovatively developed.

3.2.2 New Service Development

Frameworks developed for new product development (NPD) is the foundation for innovation in services, and several studies of NSD are based upon concepts originally developed for innovation in manufacturing (de Brentani, 1995; Johne and Storey, 1998). Early NSD research focused on the drastic gap between NPD and NSD (Atuahene-Gima, 1996; Sundbo, 1997). However, NSD is more commonly accepted being similar to that of products where theories of innovation developed for manufacturing can indeed be adopted to fit the specific needs of NSD (Lovelock, 1984; Gordon et al, 1993). While aspects of service innovation have in the last few decades been researched, innovation scholars have yet to fully examine the value collaboration and partnerships bring to the new service development process.

The effectiveness of new service development (NSD) depends greatly on the proficiency in its execution, but for service firms, it has been discovered in which the proficiency of the process creates a weak significance in finding success of the new services (Atuahene-Gima, 1996). However, de Brentani (1993) found where the various activities in the process are often executed in an aimless manner, and thus, lacks a quality of execution. Often times, service firms have flat hierarchies that lead to an overlap of activities as well as poor execution. Ultimately, innovative services deliver both direct and indirect benefits. A direct benefit would be sales increase whilst indirect benefits are window of opportunities to sell additional products, and tie current and new customers closer to the firm which increases profitability (Cooper and Kleinschmidt, 1987; de Brentani, 1989).

3.2.3 Partnerships and Collaboration in Innovation

Traditionally, the understanding of businesses suggests that superior organizational performance is based upon superiority of resources deployed through internal assets and capabilities (Porter, 1980; Amit and Shoemaker, 1993; Barney, 1991). There is evidence, though, which suggests that superiority in performance results from a synergy of a series of value adding relationships developed between individual firms (Gulati and Singh, 1998). Theoretically, these inter-organizational collaborations have typically been explained using two different, but complementary aspects: firms pursue different strategies when it comes to interacting with other firms; and relationships are either one-to-one or as a network.

Collaboration can take many different forms such as short-term where it is based on pricing to long-term relationships where it is based on profits. However, previous research indicates that inter-firm collaborations help firms absorb new technologies (Powell et al, 1996), withstand environmental shocks (Ahuja, 2000), contribute to firms' competitive advantage through learning (Sanderson, 2004), and improve survival prospects through higher levels of innovation (Saxena, 2005; Stuart, 2000). Porter (1998), though, discovered that firms who are located geographically close to each other are more innovative through collaboration.

Despite the importance of partnerships for success, research on the integration of partners in the service development process is limited, which is surprising because of the intangible and often complex nature of services as well as the inseparability of services from customers (Zeithamel, 1981). Service providers are constantly in contact with other firms and individuals where learning is enhanced. Thus, drawing on knowledge and ideas from various sources helps to identify potentially new services and solutions (Crawford and di Benedetto, 2008). A suggestion that partners is certainly used to assist not only in the ongoing production of services, but in the development of new ones as well.

3.3 Mobile Services

For services, this section reviews literature on categorization of mobile services. This will be important when it comes to the empirical chapters of this dissertation, especially concerning business model discussion. Sorenson et al (2002) categorized mobile services shown in Table 3.2 below. It is based on Mathiassen and Sorensen's (2002) task-based theory of mobile services and combines Mintzberg's (1992) and Sorensen and Kakihara's (2002) researches. Mintzberg (1992) focused more on the organizational effectiveness of complex and uncertain services while Sorensen and Kakihara (2002) suggested more integration of technological diversity. Thus, what arise from these studies are four types of mobile services: computational, adaptive, networking and collaborative.

	Low Uncertainty	High Uncertainty	
Encounter Service	**Computational Service**: server technology; standardizing process; potentially structure overload	**Networking Service:** infrastructure technology; standardizing connection; potentially interaction overload	**Low Complexity**
Relationship Service	**Adaptive Service:** client technology; standardizing information; potentially information overload	**Collaborative service:** workspace technology; standardizing material; potentially transaction overload	**High Complexity**
	Information Processing	**Information Generation**	

Table 3.2: Mobile Services
Source: Sorenson et al (2002)

Computational services deal with a low degree of complexity and uncertainty situations. Mobile services are based on a standardized process where it is accessed over a centralized server and all requests are treated equally. These services basically provide the process since it has to ensure efficiency, speed and uniformity in order to reduce tasks that have a high degree of complexity. Such technologies include wireless application protocol (WAP) and on-line games or video/audio streaming.

Adaptive services are utilized in situations that have a low degree of uncertainty, but a high degree of complexity. Information is standardized and based on a combination of server technology and customer. However, because of the high degree of complex tasks, these services have an ongoing relationship between the user and the server

which are constantly being updated. Such technologies include personalized WAP services as well as location-based services.

Networking services are characterized more on low degree complexity and high degree of uncertainty situations. Since these situations are low degree complexity, mobile services generate new information from encounters with users. Interactions are through simple connections are required because of the high degree of uncertainty and in order to standardize the connection, it uses infrastructure technology such as mobile e-mail, short message service (SMS), and instant messaging.

Collaborative services focus on tasks that have to do with a high level of complexity and uncertainty. These services provide emergent process which mediates relationships and standardizes material implemented through workspace technology such as logistics and supply chain systems. Mobile commerce is a strong example of collaborative mobile services since users in the workspace of mobile games interact with each other via individual mobile and wireless devices. Overall, though, mobile services have primary attributes of technology such as ubiquity and reachability which provide an advantage of mobile internet services over wired internet services (Turban and King, 2002; Kavassalis et al, 2003).

The literature on mobile services is important to review for this research. Mobile payment is a service and at some part in the innovation process, the service can fall into the four categories of computational, adaptive, networking and collaborative. The next sub-section will specifically focus on research relating to mobile payment services.

3.3.1 Mobile Payment Services

Ondrus (2003) examined the m-payment market as a whole, with emphasis being placed on the identification of actors within the mobile payment context. The study resulted in the presentation of an actor framework which is similar to the SSI system. Ondrus (2003) classified participants in the mobile payment market into two separate and distinct groups: the players and rulers. Players are directly involved in an m-

payment transaction, while rulers are active within the context of the payment, but not in the real-time processing of mobile payments (Ondrus, 2003). The main players, though, are the consumers, merchants, newcomers/intermediaries and financial institutions. The regulators and the technology providers become the rule generators within the framework.

Later, Au and Kauffman (2008) drew upon several economic theories such as network externalities, consumer choice and demand, switching costs, complementary goods, IT value and economics of technology adoption and diffusion to establish an analytical framework. According to Au and Kauffman's framework (2008), m-payment stakeholders fall within four categories: technology producers; government and regulators; end users, consumers and buyers; and sellers, merchants or business intermediaries. However, the robust framework can be used as a basis for the analysis of economic issues for disruptive technologies. They categorize m-payments as being disruptive technologies, but m-payments are not necessarily disruptive since it takes time for a technology to be disruptive.

Dahlberg et al (2008) in trying to categorize and summarize the extant body of m-payment literature found that the principal actors within the m-payment market are the service providers and suppliers as well as customers. The actor roles within the m-payment framework, though, can be filled by various parties such as telcos, banks, consumers and merchants. Additionally, the study revealed involvement by other firms such as handset, software and network firms as well as providers of other technologies used to facilitate the movement of the payment. Therefore, based on insights from m-payment literature (Baptista and Heitmann 2010; Donner and Tellez, 2008), m-payments flow between many different stakeholders and actors.

Alternatively, Mas' (2011) framework reduced the set of actors to only include cash merchants, corporate or bulk users and end users. Cash merchants, the sources of liquidity in m-payment firm alliances, are firms who see an opportunity to make money through reselling mobile money and exchanging it for cash on demand. Corporate or bulk users are defined as actors who make payments to many people,

while end users are defined as persons who want to keep some money in an account, and occasionally transfer some money to others (Mas, 2011). Thus, the framework in Figure 2.1 and Figure 2.2 from Chapter Two includes two demand-side actors (corporate or bulk users and end users), and one supply-side actor (the cash merchants). However, noticeably absent from Mas' (2011) framework are telcos who are vital actors within the m-payment ecosystem. Furthermore, m-payment literature supports the important role of telcos in the delivery of m-payment solutions. Telcos are likely providing the technology platforms, including hardware and software, by which m-payment solutions are executed (Ondrus and Pigneur, 2007). For that reason, this researcher believes the actor framework offered by Mas (2011) is not the most suitable framework to use.

3.4 Theoretical Framework

The theoretical underpinning of this research is the resource-based view (RBV) and the knowledge-based view (KBV). RBV helps to answer why some firms are able to obtain superior resources compared to others through attaining a position of competitive advantage. RBV attempts to address this question by assuming that firms are a unique bundle of idiosyncratic resources and capabilities (Grant, 1996) which firms build-up and deploy to their advantage.

RBV acknowledges the importance of knowledge as a potential resource, but RBV does not lay sufficient emphasis on the central role played by knowledge. Instead, RBV treats KBV in much the same way as other generic resources so that it is not prominently distinguishable from other resources. However, knowledge is argued to be a principle resource because it is considered to be socially complex, difficult to duplicate and difficult to transfer from one individual to another (Teece, 1998). Thus, this is what makes it valuable because it is linked to the unique characteristics that define knowledge compared to other resources. Knowledge based resources are not easily replicable by rivals and are intrinsically inimitable and immobile.

In referring to Figure 2.3, resources are important to the innovation process. In applying the variables from Table 2.1, Figure 2.3 showcases how firms reconfigure

their knowledge and resources in order to develop innovation and ideas space beyond parameters. Knowledge is then created through these variables. For research in m-payment systems, resources and knowledge are important to concepts and ideas in order to compare firms' innovation process as well as business models. Resources and knowledge are what is going to make firms stand out in regards of their innovative services. In order to understand the intricacies of the RBV and KBV, it is important to understand what constitutes a resource and what type of characteristics a resource must possess to contribute to the sustainability of advantages of a firm. In addition, it is important to distinguish how resources differ from capabilities.

3.4.1 Resource Based View

RBV explains how firms use their unique resources to develop, gain and maintain a competitive advantage (Katila and Shane, 2005). Resources represent assets of a firm that become inputs to the production process (Branco and Rodrigues, 2006; Kandemir et al, 2006). RBV argues that firms strategically deploy their resources to control markets. Repeatedly, firms participate in alliances and other forms of cooperation in order to get access to resources the firm does not have or have access to. Through these alliances and actions, firms exercise control over resources to limit threats and increase their competitive advantage.

Barney (1991) defines competitive advantage as a result of a firm's implementation of a value creating strategy which is not being simultaneously implemented by any competitors. He goes on to state once a firm achieves a competitive advantage; other firms are unable to duplicate the benefits of the value creating strategy. In order to create and maintain competitive advantage, firms need to engage in strategic processes of exploring new possibilities and exploiting old certainties (March, 1991).

Penrose (1959) was one of the first academics to really emphasize the intangible factors of just the internal resources that saturate a firm's competitive advantage whilst Porter (1990) included external resources. Richardson (1972) expressed resources as being tangible and intangible (Barney, 1991; Wernerfelt, 1984). Conversely, Constantin and Lusch (1994) categorized tangible and intangible

resources to be operand, or physical, and operant, or non-physical, resources. For services, though, physical resources are a crucial element for some firms depending on the type of service. Physical resources include a firm's facilities, geographic location, tangible technologies and raw materials (Froehle and Roth, 2007). It also supports a firm's technological capabilities as well as its commercialization of its services (Verona, 1999; Zahra and Nielsen, 2002). Such resources can include physical technologies that facilitate innovation for example information technology (Froehle and Roth, 2007). Physical resources are also supported by the non-physical resources such as the skills, knowledge, competences and organizational processes of the firm.

3.4.1.1 Dynamic Capabilities and Core Competencies

In literature, capabilities and competencies are often used interchangeably, but some researchers differentiate between the two to view competencies as sets of capabilities (Sanchez and Heene, 1997; Sanchez, 2004). Capabilities are part of the firm and influences firms' goals and objectives in order to achieve a potential source of competitive advantage (Wernerfelt, 1984; Barney, 1991). Capabilities reflect the firm's capacity in order to deploy those resources (Amit and Shoemaker, 1993). As a result, capabilities are assets such as skills and knowledge shaping the strategy and business models of firms (Day, 1994).

Teece and Pisano (1994) focused on the expression 'dynamic capabilities' in order to address the role of strategic management and their internal and external skills that become resources and functional competences in a changing environment. Thus, as they see it, dynamic capabilities are processes, or routines as what Nelson and Winter (1982) expressed. Lawson and Samson (2001) developed a model to explain organizational innovation. They focused on knowledge and how knowledge transforms ideas into new products and processes for the benefit of the firm and its stakeholders where these ideas are the basis of dynamic capabilities. Dynamic capabilities are viewed as being critical for firm's success in competitive, rapid changing industries, especially when little is known about particular processes or mechanism to deal.

Differences in market dynamism will determine the way dynamic capabilities are implemented. Therefore, the more dynamic the markets are, the simpler the routines or processes should be in adapting to new situations. However, the evolution of dynamic capabilities as well as learning mechanisms is affected by the market dynamisms where learning is more selective in high-velocity markets. From this perspective, in the long-term, competitive advantage is achieved because of the managers' ability to configure resources using dynamic capabilities. For Eisenhardt and Martin (2000), they link specific processes to dynamic capabilities such as alliances and turning manipulative resources of product development into value-creating strategies. They argue that because of the presence of commonalities among different firms, dynamic capabilities are more substitutable than theory suggests. Thus, dynamic capabilities cannot necessarily be the main source of competitive advantage.

Firms gain value from resources by combining them with processes which create distinctive competencies. These competencies are basic organizational routines where knowledge is created by combining tactic knowledge through path dependent learning mechanisms (Nelson and Winter, 1982). Comparable arguments about the evolutionary nature of firm performance have been explored as absorptive capacity (Cohen and Levinthal, 1990), combinative capabilities (Kogut and Zander, 1992), and dynamic capabilities (Teece et al, 1997). These studies focus on the role of intangible resources in the process of innovation. Thus, one can synthesize that firm's innovation process is fuelled by many different types of resources. Sanchez (2004) identified five modes of competencies where each comes from a specific level of activity: cognitive flexibility in order to imagine alternative strategic logic; cognitive flexibility to imagine alternative management processes; coordination flexibility to identify, configure, and deploy resources; resource flexibility to be used in alternative operations; and operating flexibility in applying capabilities to available resources.

Prahalad and Hamel (1990) focused on the core competency since it is the collective learning in firms and how firms are flexible in coordinating diverse production skills in integrating with multiple streams of technology. However, in order for a competency to be core, there are three requirements according to Prahalad and Hamel (1990): it has to provide potential access to various markets; it has to make a significant contribution to the perceived customer benefits of the end product; and, lastly, it has to be difficult for the competitors to imitate it. Yet, Coyne et al (1997) argue that the notion of a core competency is a mirage to many firms treating everything as a potential competency. They see core competencies as a combination of complementary skills as well as knowledge bases embedded in a group or team which results in the ability to execute one or more critical processes to a global standard (Coyne et al, 1997).

Few, if any, of the instruments developed to understand distinctive competencies and capabilities have a specific focus on services. There are service specific capabilities that are central to a firm's strategy and competitive advantage that enhances the understanding of some of the unique features of service innovation. However, service specific capabilities depict a service activity with an underlying capability involved in providing a service; and, at the same time, capabilities are explicit to firms in the service sector.

3.4.2 Knowledge Based View

The knowledge-based view (KBV) is an extension of RBV where the dominant theory utilized is characterized by highly competitive knowledge-intensive industries (Saarenketo et al, 2004; Grant, 1996; Kaplan et al, 2001). KBV acknowledges the central role of resources and also examines the process by which specific firm capabilities evolve and develop over time (Johanson and Vahlne, 1977). Knowledge, though, is an intangible firm resource as seen in previous research where it creates a competitive advantage (Eisenhardt and Martin, 2000; Grant, 1996; Teece and Pisano, 1994; Teece et al, 1997). Knowledge is gained through assets, through innovation, through learning, or it is embedded in routines (McGee and Thomas, 2007). Indeed, as countries' economic activities increasingly become more information- and

knowledge-intensive, knowledge based capabilities have taken on a more central role for the service sector.

There are several typologies which attempt to conceptualize knowledge being a complex, multi-dimensional construct (Canary, 2010). Commonly, knowledge has aspects of being explicit or tactic. Mostly, explicit knowledge refers to codified or theoretical knowledge whose essentials can be specified either before or during usage (Tsoukas, 2002). Tsoukas (2003) argues that tactic knowledge is distinguishable and practical, and yet, inextricable from the enactment of knowing (Tsoukas and Vladimirou, 2001), but Nonaka and Takeuchi (1995) theorize that organizational knowledge is part of the process of converting implicit into explicit knowledge or vice-versa.

Theoretical and methodological interest in terms of a firm's knowledge has a prolific grounding on how individuals learn their roles and responsibilities. Such learning involves the acquisition of knowledge through individuals embedded in existing social relations (Brown and Duguid, 2001), or organizations. Knowledge can be internal or external to individuals and firms. In order for a firm to be able to exploit external technological knowledge, then it needs to have internal skills to understand the knowledge and its usage (Cohen and Levinthal, 1989). Thus, firms need to have absorptive capacity to exploit knowledge from external sources (Cohen and Levinthal, 1989).

The focus on both innovation and knowledge has received more attention in recent years since innovation is both an exploration as well as a synthesis that involves a process of the combination and exchange of knowledge (Mingers, 1990; Nahapiet and Ghoshal, 1998). Innovation can also consist of a recombination of knowledge and other resources (Cooper, 1988). Competitive pressure and rapid growth of ICT have forced firms to review the sources of their competitive advantage, and thus, the concept of knowledge has emerged as a strategically significant resource (Grant, 1996). Therefore, knowledge plays a significant role in the innovation process (Song and Montoya-Weiss, 1998) as well as in SSI.

3.5 Identifying Research Gaps

One of the identifiable gaps is lack of understanding a developing country's innovation systems and the lack of research on emerging technologies in developing country contexts. Literature on innovation systems in developing countries has largely failed to address the specific need for poverty-reducing and socially inclusive innovation. Technologies such as mobile payment systems have enormous potential to transform financial systems for the better; which may induce positive economic and social outcomes. On the other hand, emerging technologies are often initially expensive, and so have the power to further divide the rich from the poor (Cozzens, 2009). The degree to which mobile payment systems impact financial systems will depend to a large extent on how the sector of innovation system develops.

Emerging countries are growing presences in an integrated global economy and are attracting the attention of service firms from more advanced countries (Kouznetsov, 2009). Despite the importance of India's service sector, little is known about how services are innovative (Droege et al, 2009). However, as services expand globally, understanding the way services are developed in different countries and cultures is increasingly important because previous studies have noted that cultural characteristics and a firm's native culture influence its marketing strategies (Chan et al, 2010; Kouznetsov, 2009). Indian firms and customers differ culturally from many firms in developed countries such as the UK. This difference is likely to influence how new services are developed in different countries.

Lundvall (2007) assumes that firms are central to all innovation in developing countries. This assumption can be potentially problematic and initial studies of innovation in developing countries should involve "on the ground" empirical work that explores the perspectives of multiple innovation systems actors in order to better understand their roles and interactions. Innovating in developing countries is challenging; limitations to infrastructure, firm learning, and appropriate institutions are major barriers to innovation. Innovation systems can identify failures and imbalances within a system, and can help devise interventions that take into account

the needs and strengths inherent to a specific system (Dodgson et al, 2011). In developing countries, institutions and policy initiatives must be designed for the system in mind, and cannot simply be imported from other systems (Arocena and Sutz, 2000). Therefore, this requires significant research and understanding of the innovation system of interest.

The number of firm stakeholders as well as the technological diversity in the mobile payment system has increased. Mobile payment systems, introduced in more detail in Chapter One, are evolving and presenting a range of challenges for the traditional stakeholders. Intense platform competition is increasingly observable in the payment industry and is driving a drastic redesign of mobile business models. Economically, platforms and their suppliers or providers mediate and coordinate between various firm constituencies. Business models in platform markets, rather than focusing on profit maximisation in a single market, primarily deal with getting the various stakeholder groups on board; balancing interests between these groups and with openness towards, versus lock-in of, end-users.

This research is an opportunity to apply a new perspective to the field of knowledge, specifically to SSI, service innovation and mobile payment systems. For changes that take place in services such as: the addition of a service component to products which blurs the difference between services and products; the replacement of humans with automation and improvements of quality which reduces variability or heterogeneity; and advancements in IT and outsourcing that has enabled separation of the service creator from the user. As such, these evolutionary changes deem that services do not necessarily fit neatly into these service categories, and hence, this warrants closer examination of these service characteristics. In addition, this research applies these perspectives to a specific developing country of India. Although mobile payments have been researched in developed countries, it has not been research from the firm level perspective and compared to firms in a developed country. Thus, this research offers a unique chance to add to the literature on m-payment systems in applying it to SSI framework as well as service innovation.

3.6 Conclusion

This chapter was divided into four sections where the first part reviewed literature in relationship to innovation, innovation process and services. Secondly, it discussed recent literature on m-payment systems in both developed and developing countries where it leads to the second main research question: *why and to what extent do the processes of service innovation differ between mobile payment systems as explained in the UK and India?* Thirdly, the chapter focused on the theoretical framework of the overall dissertation while examining the research gap.

Generally, services have problems with conceptualization and operational aspects since there are too many meanings and depictions of both the service sector of the economy and the basic element of economic exchange, or service activity. By itself, all firms are comprised of service activities where everything has a service component attached to it. However, the inability of traditional models of innovation to capture the specificities of innovation in services by using R&D as a proxy and focusing on technology as the output of innovative activity does not work in the context of services to a certain degree. The literature review points to several issues regarding the innovation processes of services. Process innovation has been shown to correspond with innovation internally through firm's boundaries or through a customer focus where the distinction between customer and end user is not identified. SSI framework helps to identify the capabilities and resources responsible for the innovation process as well as the underlying mechanism of innovation in services. Whilst varying process or approaches exist within innovation and services, it becomes evident that innovation process equates with more radical change in core business process whereas process improvement has a stronger emphasis on continuous learning.

With all the academic definitions and characteristics of services, it is evident that services are basically acts that happen in time and involve an interaction element between the service provider and the customer who, often times, is responsible for co-producing or co-creating value for both sides of the interaction. Services, though, are difficult to protect, especially when new since it can easily be copied by competitors, especially when the innovation is connected with the internet (Amit and

Zott, 2001). Thus, service firms engaging in innovation deal with setbacks and rapid adjustments of their current innovation because competitors can develop a similar innovation faster or because of market changes making the innovation obsolete while even still in development. On the whole though, researching a technological heavy service is exciting not only because of its intangible nature, but also because of comparing the similarities and differences of the processes among two completely different countries. The next chapter, Chapter Four, will present the methodological approach adopted for this research.

Chapter Four: Research Methods

4.1 Introduction

The previous two chapters, Chapter Two and Chapter Three, focused on the literature review of the research. Specifically, the chapters reviewed literature relating to SSI and service innovation in the context of m-payment systems in both a developed and developing country. It also discussed the theoretical framework and the research gaps. This chapter, Chapter Four, will present the methodology for collecting and analysing the data. The fundamental choice of methodology is central to the research, and indeed, guides the researcher into how to collect data as well as how to proceed once data has been collected.

This research is an exploratory inquiry because it focuses on an emergent sector in which innovation patterns and processes are experimental and provisional. Essentially, the research is qualitative in nature relying primarily on semi-structured interviews as well as secondary data. Yet, even how large the sample, it is difficult using quantitative method to produce generalizable results about a future many people find hard to envision (Thomas, 2003). Hewitt-Taylor (2001) and Ambert et al (1995) argue one cannot simply extrapolate from gathered data. The difficulty, though, are questions about the future of an emerging technology which cannot be answered through interpretation (Tvede and Ohnemus, 2001). Thus, the research is primarily interpretive asking as Saunders et al (2007) suggest the 'why' and the 'how' rather than the 'what' questions.

This chapter is divided into five main sections. The first section discusses the research problem and the research questions in more detail. The second section focuses on the research philosophy and approach. It also goes into more detail in using interpretivism, the usage of qualitative data, the inductive approach and case study method. The third section presents the research design and includes how data was collected and analysed. The fourth section focuses on the limitation of the research and how data was validated. Finally, the fifth section takes into consideration any ethical and bias issues of the research.

4.2 Research Problem and Research Questions

Simplicity in explaining a research problem helps the researcher and audience gain a better understanding of the factors that motivate the research (Janesick, 2003). There are a number of factors that motivate the choice of the research problem. For instance, ideas derived from personal and professional experiences, problems as suggested by the literature, problems that emerge from current or ongoing research projects, or more pragmatic considerations such as problems defined by funding agencies (Creswell and Plano Clark, 2007; Corbin and Strauss, 2008). Corbin and Strauss (2008) identify two parts in defining a research problem: articulating a research question that identifies the problem of research interest; and defining the boundaries that the research question is to be investigated. Thus, the research problem influences the context of the research questions as well as how the research will be methodologically designed (Creswell and Plano Clark, 2007), and to whom to interview.

4.2.1 Research Questions

Within analytical research, research questions play an important role in creating new, academic knowledge. Typically, though, research questions are derived from a theory. Research questions help identify a logical subset of the ecological sphere where a thematic focus can be used for the dialectic engagement. Once questions are established, research questions formulate hypotheses about specific cause-effect relationships that can be empirically tested. Hypotheses can be in the form of statements where the researcher discovers if the statements are true or not; or they can be in the form of questions. Regardless of what format is utilized in order to minimize the potential influence of the researcher's subjectivity and bias, hypotheses need to be carefully, and rigorously, articulated prior to data collection.

As discussed in Chapter One, the first research question is: *how does a diverse sectoral system of innovation shape business models within the mobile payment systems?* This question proposes to discover the articulations of sectoral systems of innovation in practices pertaining to the context of m-payment systems. The second research question is: *why and to what extent do the processes of service innovation*

differ between mobile payment systems as exampled in the UK and India? This question is intended to focus on the service aspects of m-payment systems and how the innovation process is developed in the two countries. Overall, the research questions both focus on innovation aspects and cannot simply be answered by empirical observations without referencing the meaning they hold for the individual participants and their perspectives.

4.3 Research Philosophy and Approach

There are philosophical positions that affect the overall arrangements of research; ontology and epistemology. These positions form paradigms which are a set of shared assumptions or ways of thinking about some aspects of the world (Easterby-Smith et al, 2002). The ontology philosophy have different views about assumptions that one makes about the nature of the world or reality; whereas the epistemology philosophy has set of assumptions about the best ways one can acquire knowledge (Oates, 2006). Blaikie (1993) states that there is no neutral ground to evaluate the relative merits of different ontological and epistemological perspectives because of all human constructions. Thus, it is incumbent on the researcher to articulate their own position regarding what it is that reality consists, ontology, and how the researcher believes they come to know that reality, epistemology.

In regards to ontological assumptions, these are not addressed separately because ontological issues and epistemological issues are more inclined to merge together (Crotty, 1998). Although ontology is tied to epistemology in forming the research paradigm, each paradigm embodies a certain way of understanding what is, as well as a certain way of understanding what it means to know (Crotty, 1998). On certain fundamental levels, all researchers, knowingly or not, make assumptions about knowledge. Epistemology is a general set of assumptions and how one might begin to understand the world and communicate this as knowledge to others (Burrell and Morgan, 1979; Easterby-Smith et al, 2002); whereas ontology focuses on researching the nature of being, becoming or reality in what makes one human.

Table 4.1 below showcases the classification of the research philosophies into two main categories based on the epistemological and ontological assumptions. These

categories are positivism and social constructionism or interpretivism (Manunta, 2000; Bryman, 2001; Easterby-Smith et al, 2002). Positivism relies on the basic belief that reality is objectively driven by immutable natural laws, yet social constructionism views that 'reality' is not objective and exterior, but socially constructed in an interpretive way (Easterby-Smith et al, 2002).

	Positivism	Social Constructionism
Epistemology	**Objectivist:** possibilities and essential for the investigator to adopt a distant, non-interactive posture. Values, biases are automatically excluded from influencing outcomes	**Subjectivist:** inquirer and inquired into are fused into a single entity. Findings are the creation of the process of interaction between two.
Ontology	**Realist:** reality exists and is drive by immutable natural laws and mechanisms. Knowledge is summarised in the form of time-context-free generalisations.	**Relativist:** realities exist in the form of multiple mental constructions, socially and experimentally based, local and specific, dependent for their form and content on the persons who hold them.

Table 4.1: Positivism and Social Constructionism
Source: Manunta (2000)

From a positivist perspective, Denzin and Lincoln (1994) propose that validity, reliability and objectivity are central to a strong research. These suggestions should ensure that results map the phenomenon being researched and can be replicated in other studies. However, there are implications for the choice of methods that facilitate such data and the principle of measurability of results. Contrasting this perspective, the phenomenological approach emphasizes the importance of knowledge in a wider context. The epistemological basis is constructionism that informs a variety of theoretical perspectives. These perspectives seek truth and meaning that are socially constructed which are subject to change based upon circumstances (Golafshani, 2003). A methodology that meets the epistemological and theoretical foundations of qualitative research is via through case study.

This research seeks to understand the drivers of innovation from a firm perspective of mobile payment services in both the UK and India. Thus, the knowledge it seeks is

the reality that the participants construct for them. The research questions posed cannot be answered simply be empirical observations without reference to the meaning they hold of individual participants and the consequent effects on the innovation process. Therefore, emphasis is placed on the subjective influences of individual perceptions and motivations already established. In addition, this research is based on an interpretivism paradigm which stems from an ontological view that the world and reality are socially constructed and given meaning by people (Easterby-Smith et al, 1991).

The main focus of interpretive inquiry is to gain an understanding as well as a reconstruction of the mental constructs of people's interpretations (Guba and Lincoln, 1994). If one assumes a relativist ontology, then interpretive research of human realities emphasize the importance of multiple and subjective meanings (Denzin and Lincoln, 1994). Interpretive researchers must recognize that as meanings are formed, transferred and used, these meanings are also negotiated, and that is why interpretations of reality are subject to change over time, even when circumstances change. The interpretive variant is concerned with subjective, qualitative phenomena that is rich in context, and aims to understand the totality of what is happening in a given situation (Saunders et al, 2006). Accordingly, this is done by gaining deeper meanings of the subject matter rather than reducing the phenomenon into smaller simpler elements in order to be able to subsequently formulate generalisations and regularities.

A further essential element of the interpretive approach is its acceptance of the intrinsic role played by the researcher. The researcher tends as a result of the applied approach to take a subjective insider's view of the phenomenon under study and adopts an empathetic stance to a certain degree. Although an argument can be that subjectivity is a weakness, and that the interpretive approach suffers from a lack of generalizability of its research outcomes. However, this argument ignores the very nature of qualitative research; the aim is not to gather data on the frequency of results, but to gain deep insights through examining individuals' experiences and their understanding of phenomena in which they participate.

4.3.1 Qualitative Approach

Generally, research methods through qualitative research seek truth by understanding interactions in natural settings where the researcher or investigator does not manipulate the phenomenon (Golafshani, 2003). Findings are commonly not produced by statistical evaluations. Data is collected in the format of words and observations rather than in numerical format of quantitative methods. Fundamentally, qualitative research distinguishes itself from quantitative by being any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification (Van Maanen, 1983). Data collection includes observation and participant observation, interviews and questionnaires, documents and texts, and the researcher's own impressions and reactions (Myers and Avison, 2002).

Typically, a qualitative approach is decided on when the phenomena of interest requires an exploration of detailed in-depth data since it stresses the values of rich descriptions of the social world (Robson, 2002; Johnson and Harris, 2002). Qualitative techniques are interpretive that seeks to describe, decode, translate, and otherwise come to terms with the meaning of certain, more or less, naturally occurring phenomena. As contrasting to that of the quantitative approach being in a controlled environment, the researcher in qualitative conducts the study in a more natural setting.

For this research, there are a number of factors that led to the adoption of the qualitative approach. First, the overall topic of innovation heeds further exploration in order to create ideas and meet the research objectives. Second, the topic needs to be studied in more depth using individuals in their natural settings, or what the phenomenon real life is like as composed of being in a controlled environment (Miles and Huberman, 1994). This enables the researcher to perceive events, in some extent, from the perspective of an insider in order to give a stronger sense of context (Bryman, 1984). Third, since the research tries to gain a better understanding of a

specific service phenomenon in the context of m-payment systems, the ability of qualitative data provides broader and richer descriptions.

Finally, although there has been research of the past few decades on service innovation, there has been little academic research about the nature or scope in the context of a new phenomenon comparing it between a developed and developing country. Overall, in terms of international business research in a developing country, strong arguments can be made that supports qualitative approaches. These arguments include the potential of achieving cross-cultural understanding of a research phenomenon, generating theory, and the ability to explore the "why" and the "how" questions (Marschan-Piekkari and Welch, 2004). The context of this research is assumed that a qualitative strategy is best because the service concept, which is the central phenomena studied, is particularly socially situated. In order to get a better understanding of the concept and its place in both countries, this warrants an understanding of the views of players in the sector. Thus, qualitative data can offer insights into complex social process more so than quantitative data (Eisenhardt and Graebner, 2007).

4.3.2 Inductive Approach

This research is inductive. The inductive approach involves analysing data with little or no predetermined theory, structure or framework and uses the actual data itself to derive the structure of analysis. It is comprehensive and therefore time-consuming, yet it is most suitable where little or nothing is known about the research phenomenon. It is the most common approach used to analyse qualitative data. An inductive approach entails making general inferences about a phenomenon through the observation of particular instances of the phenomenon (Johnson and Duberley, 2000). It allows the researcher to avoid being prone to a priori patterning of data. To a certain extent, data is left "to speak" to the researcher where, sometimes, patterns emerge, yet they are not imposed (Miles and Huberman, 1994).

Some of the criticisms associated with the inductive strategy are based on the difficulties of carrying out research without any kind of preconceived ideas of what can be expected from the data (Blaikie, 2003). Moreover, questions arise about its

generalisation power (Saunders, 2009). The use of sample data, whether random or not, do not represent the total population, consequently, the results may be influenced by the subjects under analysis. Moreover, the analytical tools are not perfect; each one has limitations or assumptions. Therefore, the results can also be dependent upon them. The only way to go beyond these limitations is to repeat the research on other samples and with other techniques, continually reviewing the results.

For this research, comparing SSI and m-payment services in two economically different countries such as the UK and India has challenges and difficulties to overcome. Some of these challenges deal with conducting an inductive exploration as well as cross-case analysis of the 13 case firms. The research could have used NSI as a framework instead of SSI, but this research is firm perspective and service specific; not national level innovation perspective or specific. Also, individual industry sectors have an innovation system that, at least in certain respects, differs from the overall national one. For m-payment systems, there are generic processes to the system that can be seen on a global level. These processes include the concept of transferring and receiving money in a bank account. However, the researcher did not know what would come from the data before conducting the semi-structured interviews, and hence why inductive strategy was utilized in order to study what and how the firms input this phenomenon.

4.3.3 Case Study Method

One of the goals of this research is to explore and explain a phenomenon where behavioural controls are not necessary, and instead, focus on a contemporary event, thus the reason why this research utilized case studies (Yin, 2009). Usually, case studies combine data collection methods such as archives, interviews, questionnaires, and observations. Evidence can be qualitative in words, quantitative in numbers or both (Eisenhardt, 1989). The use of case studies can accomplish various goals since it can provide descriptions, test theory or generate theory.

Benbasat et al (1987) summarizes case studies through a list of eleven characteristics. These are: (1) phenomenon is examined in a natural setting; (2) data is collected

through multiple means; (3) one or few entities such as person, group or organizations are examined; (4) the complexity of the unit is researched intensively; (5) more suitable for the exploration, classification and hypothesis development stages of knowledge build-up process where the investigator should have a receptive attitude towards exploration; (6) no experimental controls or manipulation are involved; (7) the investigator does not have to specify the set of independent and dependent variables in advance; (8) results derived depend heavily on the integrative powers of the investigator; (9) changes in site selection and data collection methods could take place as the investigator develops new hypotheses; (10) is useful in the study of "why" and "how" questions since these deal with operational links to be traced over time rather than with frequency and incidence; and (11) the focus is on contemporary events (Benbasat et al, 1987).

The research adopts a case study method to research the SSI and service innovation of mobile payment systems in both the UK and India. Case studies, therefore, help to identify and understand the more complex issues that underlie a phenomenon, providing an in-depth view of a specific situation or context rather than a statistical overview, or cross-section of a large category of subjects. Moreover, the aims of this research are to explore current and emergent issues as well as to understand existent theory from the perspective of the firms. The opportunity to present an in-depth portrait of a firm is particularly useful when a firm presents itself as a special case to be studies because of their distinctive nature of its activities. As highlighted by Saunders et al (2003), the key advantage of employing an interpretive, case study approach is that it recognizes the individuality and intricacies that are inherent characteristics of individual business situations; and allows these complexities to be drawn out and explore further.

Multiple case designs have distinct advantages and disadvantages over single case designs even when multiple cases yield more general research results. Yet, findings are regarded as more compelling as well as being more robust than a single case (Herriott and Firestone, 1983). In addition, multiple comparative case studies enable the identification of patterns and general explanations which is not possible from a single case. Huberman and Miles (1994) and Eisenhardt (1989) suggest that through

identification and observation of cross-case patterns in cases, researchers are able to derive unique findings and explanation. This can ultimately result in contributing to theory building or offer deeper theoretical insights (Huberman and Miles, 1994). However, conducting research using multiple cases can require extensive resources and time that could be beyond the means of a single researcher or investigator (Yin, 1994). This research uses multiple-case studies in order to explore how firms develop innovative services. Although, it should be acknowledged that any patterns arising from this research are limited generalizability. Therefore, generalisations cannot extend to a population as a whole, but instead can be used in developing theoretical propositions (Yin, 2003).

4.4 Research Design

The research design comes from the methodology roots that stem from early grounded theory building techniques where case selection, coding and triangulating data, emergence of thematic categories and theory construction form a roadmap in understanding the dynamics of the phenomenon present within single settings (Eisenhardt, 1989). In order to conduct a meaningful research, the researcher investigated different sources of data. Thus, the research follows a multi-phased research design with various data collection methods in order to be consistent with the methodological choice. After reviewing the literature and realizing the gap in knowledge, the researcher then began to identify firms within the mobile payment system for sources of data. The following sections discuss the stages of research design: data collection, data presentation and data analysis.

4.4.1 Data Collection

In designing the research through the use of case studies, multiple data collection methods are typically employed. In order to make analysis stronger, the researcher outlined in detail the data to be gathered through classification (Benbasat et al, 1987). Preferably, evidence from two or more sources converges that supports the research findings (Benbasat et al, 1987). Of the data sources utilized the most, interviews, not one single interview had the competitive advantage over the others (Easterby-Smith, et al, 2002; Bryman, 2008). Some sources are highly complementary, but a good case

study will incorporate as many sources as possible even though each has their own strengths and weaknesses. Yin (1994) identifies several sources for case study research: documentation, archival records, interviews, direct observation, participant observation, and physical artefacts.

4.4.2 Firm Selection and Access

Firms were selected from both the UK and India based on one important requirement. This requirement was that the firm had to be part of the service chain within mobile payments. The firm could either be within the front-end or back-end of the service chain where the relationship with customers was either with other firms or with the end-user. In addition, firms had to be providing the service within the UK or India; not in other countries. As Ghauri et al (2002) suggest selection criterion when carrying out multiple case studies is that subjects should be selected to serve a particular purpose. For this research, the criterion was selected in order to assure the relevance of the participating firm to study the innovation process. Overall, this led to a range of firms; some with more experiences than others, and some who are fairly new to the mobile payment service. Furthermore, these firms represented diverse organizations in regards of company size ranging from large multinational to small and medium firms.

The research consisted of purposive sampling where respondents covered a broad geographic area representing organizations from four designated sectors: banking, mobile network operators from the telecommunications sector, technology providers and government. Moreover, subjects represented diverse organizations with respect to company size, ranging from large multinational companies to small and medium enterprises. With regards to their mobile payment engagement, respondents had extensive experience in key markets, primarily within the emerging market context. Several respondents were senior executives responsible for spearheading mobile payment deployments.

4.4.3 Interviews

Interviews can take several forms. The most common, though, is that interviews are open-ended and unstructured to where the researcher or investigator can ask key respondents for facts of a matter as well as for the respondents' opinions of events. It can be a focused interview or semi-structured where a respondent is interviewed for a short period of time and the researcher is more likely to be following a certain set of questions resulting from the case study protocol. Semi-structured interviews are conducted on the basis of a loose structure that consists of open ended questions on the research topic where the interviewer and the interviewee can diverge from the questions in order to pursue an idea in more detail. Lastly, a third type of interview is structured interview that entails more structured questions similar to a formal survey.

Creswell (2009) has stated that qualitative research methods are designed to discover the meaning of a problem or issue from the perspective of the study participants and not that of the researcher. In order to accomplish the goals of this research, a protocol was developed to conduct interviews using semi-structured questions to allow the interviewees to provide a response without restrictions. Interviews are essentially a conversation between individuals where each individual has a role in contributing to the research (Gray, 2004). It is an interaction between two sides where one's perspective is of obtaining information relevant to the phenomenon and research objectives. Interview data has to be credible and effective, as well as be presented as more than just a mere conversation.

A thorough awareness of the subject matter was necessary to offer a degree of seriousness, connection, and rapport in the interviewees. Before each interview was conducted, the researcher introduced herself and briefly outlined the purpose of the research while at the same time assuring confidentiality of the interview as the researcher assumed a subordinate role as learner. The interview instrument explored the following categories: 1) definitions of mobile payments, 2) factors driving engagement in mobile payments, 3) factors impeding engagement in mobile payments, 4) critical success factors for mobile payment alliances 5) roles and relationships within mobile payment alliances, 6) mobile payment alliance configurations, and 7) benefits of engagement in mobile payments.

Since this research has been conducted in two culturally different countries, there are some aspects that required considerable adaptation to the research context such as unexpected changes to interviews days and times. In other words, the researcher needed to have flexibility in order to handle these sudden changes. Michailova (2004) discusses how aspects of conducting empirical research in Eastern Europe brings about issues that had not been anticipated or discussed since previous research has focused on using mainstream methods for only Western Europe. For research in emerging markets, Michailova (2004) has recommended an informal and contact-based approach in order to gain access to certain people working for specific firms. As such, approaches to potential interviewees begun in the beginning of 2012 through informal conversations of personal networks such as alumni networks and friends. With a few of the interviewees, a rapport was already present between the interviewee and the interviewer since the researcher was already known prior to undertaking the study although the researcher had no prior knowledge of any of the interviewees before conducting the interviews. This is what Lofland and Lofland (1995) talk about in using one's rapport in order to gain access. By having a strong rapport, this proved to be valuable especially in India given the time constraints imposed in collecting data due to certain visa restrictions. In addition, it caused a snowballing effect in gaining more interviews with other firms.

In spite of having a strong network, the researcher was still a so-called outsider especially in India. However this was not problematic although the researcher was a different nationality, gender and age compared to majority of the interviewees. Yet, especially in India, the interviewees of the participating firms reacted positively to the foreign, female researcher's approach, and in fact, helped the researcher by providing documents and observation opportunities. At times, interviewees were just as excited in showcasing their firm's innovation as well as discussing political and economic aspects of the researcher's home country. In both countries, all interviewees were male, but the researcher presented herself with an enthusiastic interest in learning about the firms' products, services and interactions with others. By being a foreigner and outsider, this almost allowed a sense of openness and

higher trust in both the UK and India (Wilson, 2006). Thus, a polite, unthreatening approach was used throughout data collection and maintained with a balanced impartiality.

4.4.3.1 Semi-structured Interviews

The form of interview used for this research has been the semi-structured model involving one-to-one interview or direct interview. This is based on the conceptual underpinning where knowledge is situated, contextual and created through the interactions between the researcher and the subjects or what is known as the qualitative interviewing (Mason, 2002). Semi-structured interviews offer more flexibility and create opportunity to obtain research-relevant information through the process of the actual interview. However, there are major challenges in using semi-structured interviews such as using poor questioning technique, inaccuracies due to poor recall, and the temptation of the interviewee saying what the interviewer wants to hear. Yet, the most frequent problem with the interview process was spending more time than planned. It became a common occurrence due to the heightened interests of respondents of the topic discussed, but generally activeness and creativity helped in moving the interviews along.

For each semi-structured interview, a generic interview template was constructed. The interview template is used to guide the researcher as well as the respondents through series of questions grouped around specific themes and service products. Although the interview template might, in some way, suggest a linearity of questions, in reality, each interview was unique because interviewees address issues in different orders and ways from their firm's perspective. Yet, the challenge was to ask questions relating to areas of interest when it was most appropriate during the interview without interrupting the flow of conversation. Accordingly, similar questions were asked at different stages during different interviews. Additionally, questions needed to be adjusted in order to reflect the background of the interviewees as well as the context of the interview since interviewees were managers, vice-presidents, CEOs or insiders of the sector. Questions related, though, to each person's perspective of sectoral systems of innovation such as regulation, technology, firms and actors as well as definitional aspects.

The semi-structured interviews were scheduled with subjects based on their availability, and were conducted by Skype or telephone. Skype presumes that the interviewee has access to a computer, the internet and enough familiarity with Skype to use it. It also relies upon the interviewee having access to Skype software in their home country. The internet is not strong enough for video interviews in some regions while some internal networks can limit the use of Skype. For this research, some of the interviews were conducted over Skype, but none were conducted as a video or face-to-face interview. Skype was simply used as a way to budget the costs involved in conducting the research. Thus, the benefits of using Skype are the low costs, ease of access and minimization of ecological dilemmas whilst allowing the interviewer and interviewee to be able to remain in their respective locations without imposing on each other's personal space. Interviews lasted between one and two hours, on average, and were recorded to improve data quality and ensure data integrity with consent from the subjects.

The interviewer fed back her understanding of what interviewees had said in order to reflect her understanding, overall, of m-payment services and offer any additional comments to be given by the interviewees. When there was possibly mis-communication or disagreement on a concept of the subject, this was explored with the interviewee and revisited, if necessary. Most of the interviews were tape recorded in order to provide factual data giving a chronological account of the innovation process, but the real analytical value came from the non-tape recorded part of the interviews. More confidence was gained the more interviewees the researcher had obtained since note taking was not as strenuous when interviews were not allowed to be tape recorded.

4.4.4 Documents

Documents can be considered a source and an alternative to interviews or observation (Denscombe, 2003). As Wolff (2004) discusses that documents are written texts which serve as a record or piece of evidence of a fact or event. With the exception of preliterate societies, Yin (1994) proposes that documentary information is likely relevant to every case study topic because information can take many forms.

As a result, documents can be in the form of letters, administrative documents, laws, books, journals, institutional and public policies, newsletters, research reports, etc. as well as visual sources like pictures, artefacts or sounds (Denscombe, 2003). Yet, it comes down to the scope of the documentary sources since there are different views among researchers because of increased usage of visual and audio-visual materials as sources of data collection (Scott, 1990; Mason, 2002). Documentary sources are evidence of people's constructions of social reality. Therefore, written words, text, and/or literature are meaningful social constructions, or interpretivism, which directly or indirectly reflect constructions of social reality.

The disadvantages in using documents are the researcher's ability to digest and understand the texts. In addition, documents can, possibly, be falsified or influenced by external powers which can reduce the credibility of documents. Jupp (1996) refers to the critical analysis of documents both externally and internally where consideration has to be made in order to ensure that documents are genuine and authentic, free from error, and provide clear and comprehensible evidence.

Specifically, for this research, documents are a source of data since it is viewed as written text and/or electronic text such as those from internet sources. Although, the advantages of using documents for this research has not only provided extensive information on the innovation and service context, it also is relevant for sectoral systems in both countries, and has contributed in no small way to the research process. Such documents included government policy statements or documents, mission statements, periodic reports including research as well as current publications on the service context. These documents were collected via websites, printed newspapers and/or from the interviewees themselves.

4.4.5 Data Presentation

The objective of this qualitative research is to inductively draw a comparative analysis about SSI and service innovation between a developed and developing country. Therefore, data results and analysis needs to be presented in such a way where the data avoids generalisation as well as offering theoretical and practical

considerations. As previously discussed, data findings and analysis were done simultaneously in phases (Eisenhardt, 1989). This process consisted of data collection leading to case analysis and cross-case analysis leading to the discussion phase. In order to present the data in answering the first research question, the data presented was best organized via sectoral systems of innovation approach. In other words, the data is organized based on each country divided into discussion of policy and institutions, firms and actors, technology, and knowledge and learning. This approach lead into presenting information on the business models being utilized within the SSI.

In order to answer the second research question, data is presented as case studies. Although there is no precise guide to the number of cases to be included, Romano (1989) has said that the literature recommending the use of case studies rarely specifies how many cases should be developed, and really it is a decision left to the researcher. Eisenhardt (1989) recommends that cases should be added until theoretical saturation is reached, and Lincoln and Guba (1985) say the limit of cases should be to the point of redundancy. Glaser and Strauss (1967) have suggested that when the themes and issues of the research become saturated in that there is no new data being found from the participation of additional case-firms, then no further cases should be approached and the process of data collection should come to an end.

This research uses 13 case studies although additional cases could have been added because the externalities do not appear to produce much variation in the phenomenon being studied, a set number of theoretical replication was required (Yin, 1995). The 13 case studies were rich with data offering a strong comparative analysis between the UK and India. In order to keep consistency, each case is divided based on four themes being supplier, demand, regulation and technology. These themes arose from thematic analysis after combining and collapsing themes from initial analysis. Although, these divisions will be explained in more detail in Chapter Six, the reason why these particular themes is because it was a way to organize the cases in discussing the innovation process for each firm's specific service.

4.4.6 Data Analysis

Data was analysed following Miles and Huberman's (1984) methods of descriptive, interpretive and pattern coding. They characterize data analysis as three interlinked and overlapping sub-processes that occur before, during and after data collection. These sub-processes are data reduction, data display and conclusion drawing or verification. There is a clear distinction between data gathering and data analysis, but the distinction is problematic for qualitative research (Myers, 2000). Literature, though, in discussing qualitative data analysis has advanced significantly since the 1980s (Miles and Huberman, 1994).

A list of codes were created in order to organize data more effectively and to help develop an initial understanding of large amounts of interview data. Initial codes, though, were originally influenced by the research questions and conceptual framework of the research, hence why interviews were conducted via semi-structured in order to allow for a sense of direction to the sequence of questions. As data collection started, lists of codes were revised. Some of the codes generated during analysis were interpretive whereas most codes generated initially were descriptive in nature (Miles and Huberman, 1994).

4.4.6.1 Initial Analysis

Coding the data, the researcher used NVivo software in order to analyze and to process the data categorization, sub-categorization and constant comparison (Miles and Huberman, 1994). Extensive annotation was used to describe the coding process which became useful later in synthesizing the findings across the various interview transcripts (see Appendix B). By systematically coding the interview responses, this enabled a clear audit trail for findings to which conclusions were able to be drawn from the data. Coded items were assigned to a pre-existing category, or what NVivo labels them as a "node." As new categorizes emerged, labels and definitions were re-evaluated where it became a process that resulted in the development of a 37-item framework of innovation attributes as shown in Table 4.2. Table 4.3 and 4.4 below displays the word frequency development from using NVivo where other themes were deducted after data was collected.

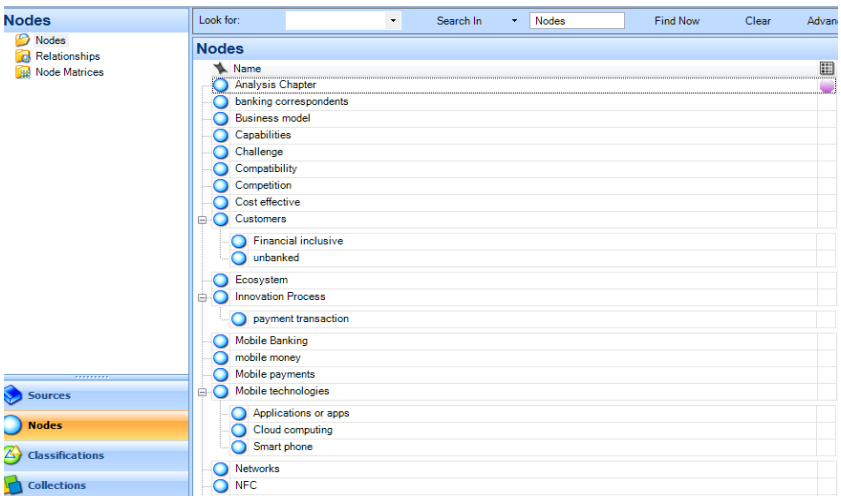

Table 4.2: NVivo Framework of Themes

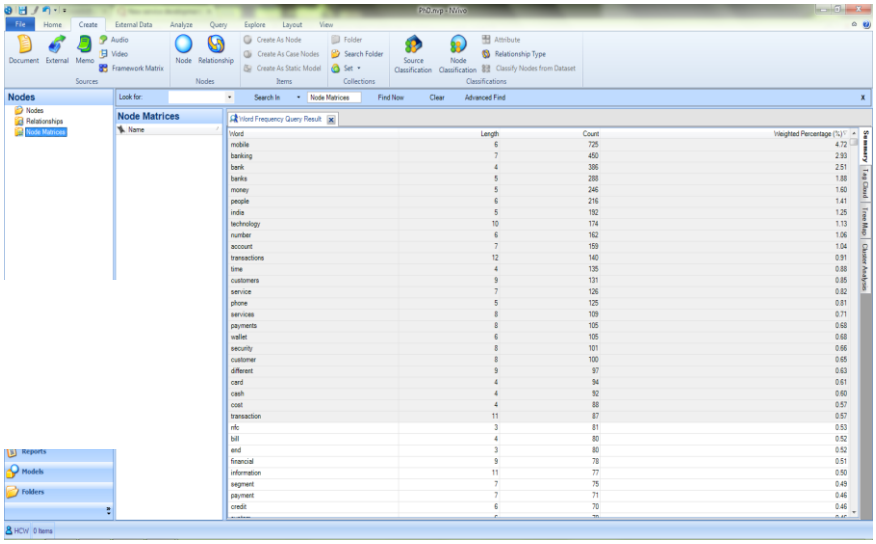

Table 4.3: NVivo Word Frequency 1

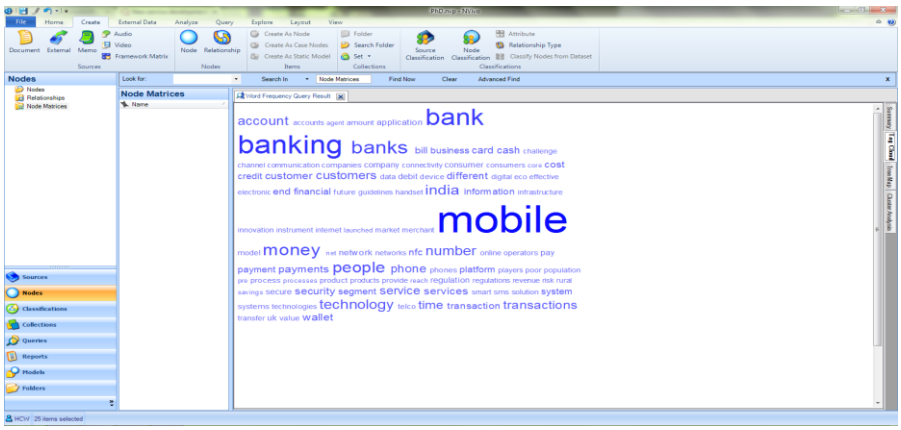

Table 4.4: NVivo Word Frequency 2

4.4.6.2 Analysing Within-Case Data and Cross-Case Patterns

At this point of the data collection process, detailed reports, or memos, for each case study were written. Memos are beneficial because they help the researcher make better sense of data as deeper analysis continues (Miles and Huberman, 1994). Ideas tend to emerge from this process of analysis. In addition, memos also help keep ideas fresh and avoid the risk of being lost in the researcher's memory. Although the reports were simple descriptions, they still generated insight in order to help with the analysis process and better organize the large amount of data collected. The outcomes of the data analysis were explained and mental maps were elaborated to clearly illustrate these outcomes. As a result, the unique patterns of each case were highlighted before the patters across all the cases were generalised. Data was then looked at in many different ways to search for trends across all cases. For each of the categories and dimensions previously identified for the initial framework, within-group similarities coupled with intergroup differences occurred.

4.4.6.3 Relationships of the Cases

Before a thematic analysis was undertaken, a preliminary review of the interview data was conducted in order to familiarize the researcher with the responses and the quality of the responses (Ritchie and Spencer, 1994). These preliminary reviews included checking for completeness and consistency within case firms, cross-referencing the cases, and adding one's impressions and reflections of the cases. Hence, commonalities and contradictions between and within cases were noted. According to the new emergent themes and relationships, the initial framework was modified. In order to assess how the new themes and relationships fit with the case data, it was then compared with the themes between variables and evidences from each case.

4.4.6.4 Thematic Analysis

The research had pre-constructed themes based on the research questions and interview questions which were then analysed even further to explore emergent themes and patterns. Thematic analysis is a search for themes identified from the

data. It draws on what Ritchie and Spencer (1994) call the framework method because it analyses individual interview records and frames them into thematic summaries. Any emergent themes that did not fit into the pre-constructed themes resulted in alterations being made to the existent list of themes within an Excel spreadsheet. Themes were then linked to extant literature where a data audit was conducted and themes were consolidated and extended. This can be seen in Appendix B where themes are shown in rows and interviewees in columns. Some themes were altered by combining and collapsing them into a single theme heading.

Once transcriptions were completed, data was organized based on themes before interviews took place as well as post-interview themes. Data was organized into the following themes: regulation, innovation/technology, service, customers, theme, players, process, and other. Data was further analysed into a more organized structure for presentation and comparison aspects into: supplier, demand, regulation, and technology. These four themes arose from the original eight themes after creating word matrix in NVivo. Although, the words "supplier" and "demand" were not word spoken during the interviews, these words correspond with Figure 2.2. Previous research on m-payment systems, such as Mas (2011) and Donner and Tellez (2008), actors or players within the system have been categorized as supplier side actors and demand side actors. Thus, additional analyses of the themes were organized into the drivers of the innovation.

4.5 Research Limitation and Quality of Findings

This research has certain limitations and disadvantages that affect not only how the data was collected, but also how the data was analysed. For case study design, one disadvantage is the use of resources that is outside the means of the researcher (Yin, 2009). As such, limitations and challenges are further magnified by the selection of research. Thus, sometimes, it can be difficult to apply existing theoretical framework of innovation onto this specific research topic because certain technological aspects were unimaginable when original literature was written. Especially in the field of international business, limitations can be acute because of the long lead time from actual data collection to publication of an academic article. Also, when researching

areas of technology such as mobile telecommunications, this research phenomena can, occasionally, no longer exists by the time an article is actually published. Qualitative research can become a disorganized and muddled process because through the course of investigations, emergent themes and constructs arise. This can, at times, create a dilemma such as how to account for the emergent themes and constructs while still narrowing the scope of inquiry in answering the research questions. A disadvantage is the replication challenge to be able to repeat the research protocol in each case in order to satisfy the issues associated with reliability and validity (Rahim and Baksh, 2003).

The research was mainly interested in bringing conceptual clarity by constructing meaning from the empirical data. At most, it only hinted towards building a theory, and this in itself, is a limitation. However, the research is highly dependent on interview data; thus, there are some obvious limitations to it. In some instances of conducting the interviews, it became difficult to decide when to stop asking questions, especially if answers raised doubts and new questions. Also, some interviewees were very happy to elaborate on their responses to questions which were almost harder to bring questions and responses back to the specific research discussion. Some interviewees were very happy to elaborate on how their service is more different to other firms' services in regards of technology and marketing. Yet, the focus of this particular research is not necessarily to evaluate a unique phenomenon or a special case, but to answer questions designed to identify the key drivers associated with innovation in a particular sector and service. The participating firms represent different segments in one sector, and data from multiple cases identified what similarities and differences were associated with the innovation process across two countries, the UK and India.

Just like any other research, a crucial concern is the quality of the research. Research that aligns with a positivist convention addresses the quality of the research in terms of objectivity and reliability, and internal and external validity (Guba and Lincoln, 1994). Yet, if data is qualitative in nature and collection is based on individual's perceptions of the relevant issues, then the equivalent criteria cannot be applied in

the same way. Essentially, the quality of research is determined by the attention given to reliability and validity (Yin, 2009). Yin (2003) argues when the research is using case study methodology, then the research should be evaluated against the criteria of reliability as well as the construct, external and internal validity. Equally, during data analysis, data collected from other sources were compared and contrasted with interview data in order to identify similar and different content as well as to triangulate the data. This was designed to increase the level of validity and reliability of the findings (Golafshani, 2003; Yin, 2009).

4.5.1 Reliability

For reliability there has to be a level of consistency where the ability of data collection and analysis procedures provide the same answers whenever research is conducted even when another investigator follows the same procedures to achieve similar outcomes (Kirk and Miller, 1986). In order to understand how decisions are taken during the research phase, Guba and Lincoln (1989) discuss the idea of using multiple data sources and a trail or sequence of actions for reliability. Creswell (2009) describes reliability as the consistency of approaches used by different researchers in various studies. Likewise, Yin (2009) describes reliability as the consistent uses of procedures by researchers, but he focuses more on the goal of achieving the same results through those procedures. Basically, it is what essentially Miles and Huberman (1994) refer to as dependability.

4.5.2 Validity and Trustworthiness

Validity is concerned with the accuracy of findings that are guided by the application of specific procedural step with criteria rooted in the positivist convention (Golafshani, 2003). Validity is the ultimate universal criterion of quality in terms of knowledge creation. Generally, though, validity is talked about in terms of truthfulness. Hammersley (1992) views an account as being valid or true only if it represents the features of a phenomenon the research is intended to describe accurately. In order to establish validity, it requires determining the extent that conclusions effectively represent empirical reality (Goetz and Le Compte, 1984). Yet, research requires having an assumption of an objective reality in order to define validity in terms of the approximation of the truth about the way things are or really

work. In other words, from the researcher's perspective and perception of understanding, this defines reality as a function of one's ontological and epistemological assumptions, thus, validity is defined as how well a result or interpretation represents the truth of reality. Therefore, validity cannot be considered a universal decisive factor. As a consequence, it is nothing more than an indication of agreement on a subjective finding.

Although, Creswell (2009) identifies internal (experimental procedures) and external (drawing incorrect conclusions from sample data) validity as threats, it is a somewhat narrow definition that overlooks a dated, but relevant conceptualization by Wainer and Braun (1988). They conceived validity from quantitative perspective; not qualitative. However, in regards of construct validity, this develops from initial concepts or hypotheses. This then directs the researcher to specific data that should be as well as how the data should be collected. Yin (2003) discusses the importance of using multiple sources of evidence in order to establish a chain of evidence to ensure the correct measures are taken regarding concepts under investigation. In other words, the issue of construct validity is significantly important to research.

4.5.3 Triangulation

Triangulation is a critical addition to the robustness of the data collection and resulting analysis from interpretavist case study method. Traditionally, triangulation is used to gain multiple views of an issue or phenomenon in order to strengthen the representation of the data and to further enhance the reliability and validity of data collected. Data is not perfectly repeatable with observations and interpretations. Thus, triangulation serves to clarify meaning as well as identify ways the phenomena are being seen (Stake, 1994). Denzin (1978) identifies four variations of the triangulation technique: data, investigator, theory and methodological triangulation.

This research is predominantly exploratory and descriptive in nature, it also focuses on the determinants of innovation process in order to explain the why and how innovation manifests itself. Therefore, the use of multiple sources of evidence, data collection and analysis process helps to address the issue of whether presumptions

and conclusions drawn by the researcher are correct or not. This research employed the data and theory triangulation (Denzin, 1978). Data triangulation was used whereby data was collated using various sources such as archival documents, government reports, company reports and documents. Through interviews with various respondents within the mobile payment ecosystem, it was suggested there was a lack of interoperability in both countries. These suggestions were further confirmed by both the UK and Indian government reports that indicated regulatory responses to enhance interoperability. Furthermore, as established in Chapter Two and Three, various theoretical and conceptual perspectives have been employed in order to help examine the subject matter at hand. The use of these varying theoretical frameworks, which themselves derive from varying disciplines such as systems of innovation and service innovation, enables varying perspectives to be applying in the study of mobile payment systems. Thus, this can be interpreted as a method of triangulation as suggested by Denzin (1978).

4.6 Ethical Issues

Ethical issues relating to informed consent, right to privacy and protection from harm of all participants in the research were considered. In order to minimize the element of risk, the researcher exercised due care when interacting with participants and interviewees, especially when interviewees were asked to share data and information that only they or superiors may have considered confidential and proprietary. Each interviewee was asked permission before the interview was conducted to record the interview with the option that participants had the right to deny this option. Certain interviewees expressed their concerns with recording the interview and opted to not have the interview recorded, which the researcher respected. Interviewees were provided the interview questions in advance as well as what aspects the research would have on the sector overall. By providing questions in advance, interviewees were expected to conclude that information to be collected, along with their responses, posed little risk of having communicated negative attributions towards themselves or the firms.

4.6.1 Bias

The researcher and the participants can interject bias if there is vested interest in the outcome of the research results, have a low tolerance for contrary findings or does not base findings solely on the evidence generated in the research (Yin, 2009). As a triangulation step, bias was further reduced by interviewees who were knowledgeable of the examining phenomenon and were located in different hierarchal levels with their firms (Eisenhardt and Graebner, 2007). In order to minimize participant bias, it was made clear by communicating that participant input would not be individually identifiable and that the researcher would not personally benefit from any firms participating in the research. In addition, each participant was informed that there would not be personal benefits from participating in the research, except receiving a summary of the researching findings.

4.7 Conclusion

Methodology is the cornerstone of every research project where the way it is designed and handled determines the credibility and validity of the research. This chapter discussed the methodology in more detail as well as the data collection and analysis procedures. The main argument in choosing between qualitative and quantitative methods largely lies on the methodological orientation as well as how reliable and valid the research could be from the methodological approach. Generally, qualitative research is used more so when research methods seek truth in understanding interactions in natural settings, especially where the researcher does not manipulate the phenomenon and findings are not being produced by statistical evaluations (Golafshani, 2003). The epistemological basis for qualitative research is focused on constructionism since it informs a variety of theoretical perspectives where truth and meaning are socially constructed and subject to changes in circumstances (Golafshani, 2003). Therefore, case study methods represent one methodology that combines the epistemological and theoretical foundations of qualitative research. Additionally, because this research is exploratory, it is an effective and common way to discover the complex behaviours and thinking behind the decisions made in the development of innovations (Brun et al, 2009; Stevens and Dimitriadis, 2005).

Knowledge gained from this research can provide valuable insights to be used in the development of innovative services, and especially direction for future research in services from developing countries. This chapter described the philosophical position as well as the design of the methods proposed. A researcher cannot simply proceed along establishing and reporting warrants for the quality of one's results and interpretations without thinking the logic and rationale that those warrants fit together as well as being relevant to the nature and purpose of the research. Just the same with methods, procedure and research design are specific to the methodological approach of the research as well as the evaluative framework that establishes the quality of one's research results and interpretations. Finally, this chapter detailed the procedures used to collect and analyze the empirical data. The next two chapters, Chapter Five and Chapter Six, will present the research's empirical data as well as the case studies.

Chapter Five: Sectoral Systems of Innovation in M-Payment Systems

5.1 Introduction

Chapter Five is the first of two data presentation chapters. This chapter describes in more detail the definitional and technological aspects of m-payments systems. It then introduces the characteristics of sectoral system of innovation in the context of m-payment systems in both the UK and India. A brief overview of the institutional framework of the policies is discussed and how it affects the sector in the two countries. The chapter then examines how technology is utilized and the striking characteristics of knowledge and learning in the m-payment SSI. Finally, the business models that are employed by the firms will be discussed in more detail.

This research was conducted to explore how the SSI and service innovation in m-payment systems compare between a developed country, the UK, and an emerging economy, India. The aim of this chapter is to purely discuss the sectoral systems of innovation in mobile payment systems. As previously been mentioned, the SSI framework provides an integral conceptual frame to consider the cumulative and interactive nature of innovation as well as the strategic choices of firms in regards of business models being developed. This helps divide the data in order to examine to what extent there are sectoral communities and to what degree individuals, such as actors and institutions, have in advancing the technology. Some examples reveal strong sector characteristics in terms of the innovation process and approach to technology development while others show international characteristics in advancing technologies for global standardization.

As previous mentioned in Chapter Two, although Malerba and Orsenigo (1993) and Breschi and Malerba (1997) contributed theoretically to the idea of sectoral innovation system, the actual sectoral patterns of technical change is owed to Pavitt (1984) and Bell and Pavitt (1993). Previously defined, SSI is a group or system of firms that are active in developing and creating products in a specific sector. On the one hand, these firms interact and collaborate in technological development and market activities, but on the other hand, the firms compete against each other. The

business models represent the strategic choices these firms make in how they incorporate SSI into the service of either m-payment, m-banking or m-digital wallet. With the rapid development of web-based applications and technological products, banks are being challenged by other actors and firms in the sector who have not focused on financial services in the past. Therefore, this chapter will also analyze the production and technological environment while evaluating the resources and knowledge firms utilize the m-payment SSI.

5.2 Mobile Payment Systems

M-payment systems are increasing in users globally and experiencing an incredible boost in competition by firms from different industries. As what the Director of Business Development and Innovation for Tesco Bank has said that m-payments are bringing "the digital world to the physical world."

For all the various definitions of m-payments, the main aspect that they share is that there is a process involved in transferring monies. Indeed, there are many ways to facilitate a mobile payment, but it is still a complex transaction depending on the amount and specific type of transaction. Yet, a payment is not necessarily a technological aspect since a transaction needs authentication as well as authorization. It is innovative how these transfers are done as well as who is involved in the transfers. The Chief Marketing Officer at Eko Financial Services in India describes the transferring process as consisting of two parts:

> *Yeah, I think what's important to understand is that transactions, financial transactions, essentially consist of two parts. One is the exchange of information and the other is the exchange of funds. The exchange of information is the cheaper, when you're dealing with physical cash. The exchange of funds is expensive. But if you make both of those electronic, then of course it doesn't matter whether it is mobile or it is not, it really doesn't matter!*

In the UK, m-payment systems are more of a complementary service, but through small changes, adoption of the services are growing and becoming more widespread and acceptable. Specifically, the Lloyds Bank manager compares mobile banking to electronic banking and teller banking in regards of customer base:

So mobile hasn't even reached, you know, a saturation point so most banks have between twenty or thirty per cent of their online base; banking on their mobile, so once that starts to reach fifty, sixty, seventy, a hundred per cent, you're going to have five, six times the amount of transactions a day, than you were managing previously.

Existing m-payment systems can be classified into two types: mobile point-of-sale (PoS) or account based (Gao et al, 2005). The mobile PoS system enables customers to purchase products on vending machines using their mobile devices. The second type, account based, are payments developed specifically for products or services. When it comes to the payments, though, they fall into four categories: low-value P2P transactions, higher-value P2P payments, regular payments such as utility bills, or irregular payments such as gifts to individuals or online payments. However, it is difficult to separate the payment methods from other aspects of banking or financial services. Therefore, it is necessary to discuss the various aspects of m-payment systems in more detail below because there are different aspects of the same technology as well as being different regulatory responses to the m-payment systems between the two countries. Every person interviewed for this research was asked how they defined an m-payment, m-banking and m-digital wallet to see if there were any contradictory definitional aspects as well as which payment system they design their services around the most. These three specific kinds of m-payment systems will be discussed below in more detail.

5.2.1 M-Payment

An m-payment is a payment that transfers money from one account to another by using a mobile phone. The Vice-President of Corporate Payments at Barclays Bank is very specific by stating that an m-payment "is where you don't use conventional banking to receive and transfer funds, but you use it unconventionally." It can be implemented by either a bank, telco or technology firm using various kinds of technologies.

The technologies for m-payment systems are near field communication (NFC) companion devices, embedded NFC, SMS text, and/or voice. NFC companion enables contactless proximity payments with merchant's PoS terminals by using a

range of technologies such as stickers and microSD cards. NFC leverages existing contactless card standards without the need for telco cooperation, but the device is limited to a single payment account as well as having high initiation complexity. Compared to NFC, SMS text provides a similar process. There is greater usage with SMS in m-banking because it has ubiquitous capability availability on a vast majority of handsets. Voice is a niche technology used mostly for account servicing and bill payments with m-payment authorization, but it comes at a high cost with live agent situations and inefficient data communications.

Another m-payment technological process is platform-specific applications, or apps, that deliver a more unique experience as compared to Wireless Application Protocol (WAP). Apps have more dynamic capabilities because they can provide brand awareness and cross-selling aspects. Generally, though, apps are developed to operate on specific operating systems such as iOS or Android, and therefore, can carry a higher development cost for firms. All of these technologies offer very similar services, yet their innovation processes differ.

5.2.2 M-Banking

Specifically for banks, m-banking is a comparatively straight forward service. It simply is the transferring of money from one's bank account to another. As compared to m-payment, with m-banking the sender and receiver both have to have bank accounts. The RBS manager in the UK described m-banking as an illusion of electronic banking as well as being another banking product for consumers:

> *Well, I think the evolution thinking has been mobile banking being an extension of e-banking, if you look at some of the earlier banking apps, quite a lot of the ones that are out there just now. They merely allow you to access the website of the bank, for questions, so it just references the website in mobile format.*

It can be built with relatively low cost as well as low risk since it can be adapted from existing internet platforms to mobile devices. Thus, there are little to almost no incremental costs for each additional mobile user which makes justification for focusing on the innovative service easy to rationalize. The manager at Lloyds Bank in the UK is more detailed in describing the evolvement of m-banking:

I think today it is around saving time, I think it's also around something that most customers wouldn't even answer or think of, which is that in the past they had to rely on their memories, to work through their day to day errands and payments. So I'll give an example, five six years ago, you were logging on line before you went to the log, and throughout your day of shopping or purchasing things, you would roughly calculate in your own head how much money you would have left at the end of the day and then maybe the next day when you got home, you would then log again into my banking and see how much you had left.

In other words, m-banking has been changing the behaviour of people. Specifically, it is changing the spending habits. Mobile phones are driving new transactions and creating a faster, more secure way of purchasing goods and/or services.

In m-banking, there are three kinds of main technologies being used for the transfer process SMS, mobile browser, and custom application. SMS is more widespread in developing countries with alert capabilities and applications. SMS can be used on various mobile platforms and carriers, but in some regions it is not permitted because of network regulation. This reduces functionality as well as raises security concerns. The mobile browser, more widespread in developed countries, connects mobile users to an augmented internet banking site. The mobile browser integrates internet banking with existing internet platforms and works on all mobile devices. It takes a number of steps to log in, but adaptation to a smaller screen is not always done well with graphic transfers. However, the mobile browser offers no competitive advantage. For the custom application, it is gaining significant traction more-so in developed countries since it can incorporate coupons and location based services, thus providing a much richer experience for the end-user with cross-selling opportunities and loyalty retention. However, there are integration concerns because customization is required for each mobile device. Also, it is more expensive to deploy due to network and download costs.

5.2.3 M-Digital Wallet

The m-digital wallet is increasing in availability in both the UK and India. Barclays Bank in the UK defines an m-digital wallet similar to an m-payment with the difference being who the firm holder of the wallet is. The difference between the m-

digital wallet and m-banking is that due to regulation, one cannot withdraw physical cash from it. The RBS manager specifies how different the m-digital wallet is from m-banking and m-payment by saying:

> *…money is a mechanism for assigning a value to a good or a service…money came along as an exchange of, alright you could say for being a blacksmith and shoeing a horse for two goats, and the market place was set up. But there was a common means of exchanging value. Banks grew up around that basic premise and that's still the basic premise. The reason you got a bank was, well if it stuck under the mattress, someone could sneak into the house, beat me up and nick it out from underneath my mattress. So they didn't want to do that, banks came along with big vaults and they literally put the money in the big vaults and when I wanted to spend it, I went to the bank, took a little bit out, put it in my wallet, went to where the merchant I wanted to buy something from and handed some of that to them…*

Whereas the software engineer at TIBCO defines m-digital wallet and the difference between m-payment when he says:

> *My definition of mobile payment is capability to pay with a mobile device. You can have a mobile payments service that do not integrate with any mWallet capabilities like an on-the-bill micro-payment solution for instance. And inverse, you can have a mWallet solution without any mobile interactions for instance, paypal is an mWallet, that can be used solely from the internet.*

In other words, no matter if one has an m-digital wallet, they still have to use the banking services even with the latest innovations. When credit cards developed in the 1950s and 1960s, banks were not threatened by the services of Visa, Mastercard or American Express. Thus, banks are not worried about influence of m-payments from outsiders or non-financial firms. Also, software firms view m-payment as a capability different from m-digital wallet.

The technology firm, Monitise, says it is very time consuming to build a digital wallet, but they are a threat to banks as well as credit cards. The telco firm, India Cellular, describes the m-digital wallet as:

> *Mobile wallet is more at the source; mobile payment is using the mobile to see the payment, so when you do a mobile payment you need not have a mobile wallet at*

the back end is for all you mobile money, mobile payment is just really the payment but mobile wallet is the custodian of the place where you hold your money.

The m-digital wall adds more value and generates other aspects of revenues from coupons and loyalty rewards. Driven by analytics, it uses location-based and merchant-funded offers to specify the coupons and rewards. Also, it uses the existing contactless card standards while being able to access multiple accounts via mobile interfaces. In addition, it provides more security via an additional PIN on a mobile handset. Instead of carrying cash or credit/debit cards, everything is conveniently stored on the phone similar to a physical wallet. However, it is limited to the availability of capable handsets since telcos have more control of the handset inventory and distribution. Also, merchants have to be able to accept the payment transaction. Overall, though, one still has to use a bank in-order to input money into the wallet.

5.3 Sectoral Systems of Innovation

The SSI framework provides a valuable analytical and prescriptive tool for identifying the needs and strengths inherent to the system as well as the failures and imbalances. The SSI system offers an alternative perspective to innovation and the linear model of innovation because stages of innovation are a simple and direct flow of knowledge from research through to production and marketing (Mytelka, 2000). Linear innovation only reflects new production innovation, whereas SSI is more complex with networks of actors and the linkages between them. Additionally, SSI includes non-technical or intangible features.

One of the aspects of using SSI for this research is that one can agree or disagree with what the assumptions the system showcases. Although Malerba (2002) discusses the idea of geographic boundaries that need to be considered for sectoral innovation analysis, firms are central to the system. In terms of emerging industries, SSI explains that knowledge is developed and then actors change the knowledge into economic value accordingly to the needed institutions being built and how the

industry evolves. Often times, though, the individuals can be the most important feature since individuals are involved in several aspects of the technology.

For developing countries, firms and institutions are largely conditioned by the specific properties of SSI because, to some extent, firms are considered latecomer firms. As discussed previously in the literature, latecomer firms and institutions will lack the competence to create major innovations to compete on a global level since they are dislocated from sources of technology and R&D (Hobday, 1994). In addition, as compared to advanced countries, developing countries will have a disadvantage with the demands of users (von Hippel, 1988). For that reason, dislocation from advanced users is, often times, related to lack of competence to innovate in latecomer firms, but there are few exceptions within SSI.

The next section will present in detail data from the research in terms of m-payment SSI for both the UK and India. Included in it will be discussions on policy and institutions, firms, technological infrastructure and knowledge learning. The next chapter, Chapter Six, will go into more detail in regards of specification of firms and their innovation process via case studies. However, in order to offer a comparative analysis, this chapter, will purely focus on the m-payment SSI as well as business models being utilized.

5.3.1 Policy and Institutions

The main institution to be discussed in this research is going to be government institutions although there are others such as universities. This is because government institutions are discussed more in data interviews and it has a bigger affect on the sector. Governments can influence the preferences of customers and the attitudes of the interactions between customers and firms.

The overlapping issues with regards of regulation deals with two specific industries: financial and telecommunication. These industries deal and regulate the same concerns of interoperability, universal access and customer protection, but at different perspectives. Regulation is important because it maintains stability in the

system and protects customers. Therefore, governments, through regulations and policies, can manipulate the demand conditions and the direction of innovation in a complex and dynamic way.

Financial regulation deals with: know-your-customer (KYC), redress, security, integrity of transactions, and cashing out. Since this m-payment SSI involves money transfers and transactions, it comes as no surprise that financial regulation has a heavy hand in both countries in terms of who is allowed to interact in the service chain and the amount of transfers or transactions. Whereas the telecommunication regulation deals with: market entry, anti-competition, access to scarce resources, tariff regulation, interconnection, universal access, quality of service. These regulations are based on control of market power since, in essence, telcos are licensed to transfer information even if it includes financial information.

5.3.1.1 Policies and Institutions: United Kingdom

The key policies for the UK distinctively cover the following areas: electronic money (e-money), payment services, anti-money laundering, and consumer and data protection. Many of the policies and regulatory bodies in the UK fall under European Union (EU) initiatives. For instance, the EU E-money 2000 Directive was the European Union's first attempt to regulate and integrate EU e-money banking practices (Official Journal of the European Union, 2009). The e-money directive is focused on increasing competition in this sector by allowing non-banks to enter the market as e-money issuers under a lighter regulatory regime. This policy confirmed the central proposition that e-money can indeed be redeemable in order to ensure the owner's confidence. This approach is interesting to note because the EU did not elevate e-money retailers as banker firms since they would hold money in digital form. Instead the policy defines e-money and introduces the idea of a special type of credit institution being the e-money institution, yet it is not subject to the same regulations as other credit institutions or banks since capital requirements are set lower.

Taken from the EU second e-money directive of 2009 in encouraging new entrants to the market in order to increase competition, the UK implemented the Electronic

Money Regulations 2011 (EMR). EMR created a separate registration and authorization regime for issuers or suppliers of e-money that are not full credit institutions, credit unions or municipal banks. According to EMR, firms that are neither a bank nor a building society need to register as a small e-money issuer, or else they register as an agent of an authorized e-money issuer. One of the major changes of this law is that e-money suppliers will be able to engage in activities other than issuing e-money with extension of the "limited networks exemption" which aligns with the definition in the EU's Payment Services Directive.

The Payment Service Directive is the legal framework and regulation for all payment services in the EU and the UK. The framework includes banks as well as other payment service providers such as merchants, firms operating money-transfer systems, e-money institutes or telcos. Ultimately, as the Lloyds manager discusses in regards of regulation:

> *....regulation impacts customers, in my opinion, potentially to a more convenient or innovative service. I guess it's also there to protect them, so I guess I've seen a lot of cases recently where banks have abused that and I therefore regulation was required. From a banks perspective then, to me level playing fields, so everyone is impacted by the same regulation. So whilst it might impact your revenues slightly and impacts everyone's revenues, so it's not as if it's a competitive advantage to be gained.*

Just like banks, the payment service providers need to be authorized by the national supervisory authorities. However, authorized e-money institutions (EMIs) are subject to the full regulatory body of the Financial Services Authority (FSA) regime. Yet, authorized EMIs may provide payment services which are not related to actually issuing e-money. Thus, in order to be an e-money supplier, the firm needs to satisfy a number of core criteria specified by the FSA without having to first obtain a banking license. In essence, this means that as long as e-money suppliers can meet the capital requirements of one million Euros or 2% of the e-money to be issued, they are free to become an e-money issuer. This has increased new firms entering the competition as can be seen with telcos.

As the Tesco Bank manager in the UK states "(the) payment councils are pushing towards mobile payments." Indeed, the UK Payments Council is the organization that sets the strategy for UK payments and was set-up by the payments industry in 2007 as a way to standardize the system. It is a voluntary membership but works closely with contracted schemes in the overall payments industry. There are a number of payment schemes the council works with, but specifically Fasters Payment Limited (FPL) covers the mobile payment systems. This scheme enables mobile and internet payments to move fast and securely once the transaction process begins. There are ten banks and building societies who are members of the scheme in the UK. These banks include Barclays, RBS, Lloyds TBS and other banks. As of 2012, the scheme says that all payments must reach the recipients' account by the next business day after the sender has initiated the transaction.

Within the last year, a proposal by the UK Treasury department is trying to focus and organize a regulatory body in order to ensure that the UK payments system facilitates competition by allowing open access to market players. Basically, the UK government is trying to bring payment systems into a competitive structure while at the same time have a focused regulatory regime. As of March 2013, the UK government has outlined plans to overhaul the regulation of payment systems in order to prevent larger banks influence in monopolizing the sector. The newly formed Financial Conduct Authority (FCA) will try to ensure that all banks have access to payment systems. Under this proposal, payment system providers or operators have to adhere to licensing conditions. These conditions consist of compliances that would be enforced by FCA such as rules on efficient and transparent pricing, non-discriminatory access, good governance, and maintaining and developing their payment system.

In regards of telecommunication regulation, interesting to note, m-payments are not specifically addressed. However, Ofcom, the independent regulator and competition authority for UK communications industries, has intervened in relation to 'voice' call termination charges and 'voice and data' international roaming charges. Ofcom will no doubt be watching this emerging space with keen interest.

5.3.1.2 Policies and Institutions: India

In India, the role of the government is crucial and significant for m-payment systems no matter the technology involved. India has continued to grow in electronic transactions and is going to encounter more exponential rises in volume due to the increase of government benefit payments as well as personal banking transactions. Therefore, the system has to be able to serve the growing payment needs of end-users and customers.

Historically, the role of banks in India have been tested and experimented in three economic stages where the goals are economic growth and poverty reduction, but with heavy emphasis on industrial sector policies and agriculture policies since it was expected that banks would be the main lenders to these industries. Indeed, the decades of the 1960s to the 1980s have been significant in terms of building and experimenting with policies. By the end of the first economic stage, 1969, the government realized that banks needed to play a more active role in poverty reduction and pushed the country onto the trajectory of higher growth. This is when banks became nationalized in the second economic stage and many other government policies were directed at more poverty reduction outcomes. The third economic stage, 1991 onwards, was really where reforms in the banking sector begun. Market-oriented policies were introduced and banks were largely freed from many regulations.

The Indian government has a clear vision for m-payment systems especially with their recent investment to expand the various capabilities across India. The Reserve Bank of India (RBI) is the main governmental institution that monitors the regulator response for all m-payment systems. In 2005, RBI recommended that banks needed to increase access to their services for the un-banked population by using m-payment systems. RBI, in their capacity, has undertaken a number of initiatives as operator, overseer and catalyst of creating a strong, modern payment system and settlement infrastructure for both retail and large-value payments. In 2012, the government released a task force report on forming a unified payment infrastructure that is linked

to the biometric Aadhaar number (CGAP, 2012). The Aadhaar number is a twelve digit individual identification number that is issued by the Unique Identification Authority of India which serves as proof of identity and address (Indian Government, 2012). However, it is voluntary to get the number and it not yet required by the government.

RBI has focused on creating standardization and interoperability through prescribing message standards where it enables customers of a bank to perform m-banking transactions regardless of their telco providers. However, similar standards have yet to be replicated in m-digital wallets or inter-bank m-payments. As the manager of National Payments Corporation of India (NPCI) says in regards of regulation:

> *So let me put it this way India has never prescribed banks to tie up necessarily with operators, or just the telecomm operators. If telecomm operators want to be in the State in India, they need the bank to provide cash out and other services, which are more, banking related. So if they were to kind of operate a security framework, the multiple regulations out there in India, so that's what comes because you use the world banking, correspondent or things like that.*

Recently, RBI has removed the restrictions of their agent network whereas before only one agent could transact on behalf of only one specific bank. Now customers can transact with agents of one bank even if their account is held at another bank. Not only has this lowered the overall costs of transactions, but it has allowed the entire banking system to be more efficient. In essence, sharing multiple agents creates interoperability, and this acts very similar to ATMs where an individual can withdraw money from another bank's ATM machine. As the NPCI official states "[T]he regulations are, the country's regulations are very very forward looking and they're willing to experiment with the things to provide a state that is secure and cost effective." Yet, the manager for Atom Technologies, a technology firm in India, sees regulation as being both helpful and a hindrance in the sector:

> *[F]rom a world banking perspective its, in terms of the limits I don't think, the Indian regulator, have come along in terms of the specific watchdog for technology that we maybe use, its primarily driven by the security channels out there, and watching out for things getting used on other channels.*

The other regulation is the telecommunication industry. The Telecom Regulatory Authority of India (TRAI) has issued mobile payment quality-of-service regulations. These regulations allow access for banks to use SMS, USSD and IVR services from the telcos' networks in order to provide banking services to customers. Also, these networks can optionally facilitate the banks to use WAP. The response time for delivery of a transaction for just m-banking services is set at a maximum ten seconds for SMS, IVR, and WAP, and two seconds for USSD. The regulation also mandates that if a SMS sent by the bank is not delivered to the customer due to network or handset-related problems, a USSD communication to the customer needs to be sent in order to confirm the completion of the transaction. For m-payment transactions, the service providers have to meet the QoS standards laid down by TRAI for Cellular Mobile Telephone Service as well as certain customer-centric parameters as dictated by these new regulations. In addition, financial institutions or banks have to maintain complete and accurate records of all m-payment transactions.

5.3.2 Firms and other Actors

There are many different firms and actors in the process of implementing m-payment systems. Firms are actors and actors can also include the consumers, merchants, telcos, device manufacturers, financial institutions and banks, software and technology providers, and government. Each of these actors has different incentives and strategies. At times, interests and strategies between these various actors may cause confliction. For instance, telcos and banks like to maximize revenues through each transaction, yet customers and merchants want to minimize costs for each transaction. Therefore, the expectations are different for each actor in the system.

Customers are a considered a group of actors in the SSI system. They can affect the direction of suppliers' and providers' innovation as well as contribute their knowledge to the innovation process. As Pavitt (2005) discusses that innovation is basically a matching process between the exploitation of technological opportunities and the satisfaction of users', or customers', needs. Therefore, providers have to fit their technological solutions to fit customers' needs. These needs can be triggered during the introduction of new technology and corresponding products or services.

However, there are limitations in the providers' ability to detect these needs. Limitations such as firms' selection of customers can be biased; collection and appreciation of customers' needs are time- and resource-consuming; and some customers' needs can only be discovered when providers interact with users directly or when providers and users are located somewhere with similar conditions. Similarly, customers may be aware of new needs at different points in time because the need for a particular product or service usually starts with a small group of customers and then, later, permeates through the rest of the population.

Growth and expansion in m-payment SSI are owed to certain actors like telcos who are increasing their market share and pressuring banks to be more innovative. However, banks are subject to more stringent regulation as compared to other firms which almost limits them in regards of innovation aspects. Thus, telcos are becoming more aware of new opportunities as mobile devices are turning into a commodity.

5.3.2.1 Firms and other Actors: United Kingdom

The m-payment environment in the UK is intricate and just as crowded compared to India. The UK m-payment sectoral system of actors includes the existing infrastructures of telcos, the bank network and payment service providers. However, the UK market is, essentially, a foundation stage of m-payment systems. Many firms are starting to make the plunge into the sector from outside their normal services like telcos and technology firms, but these firms have not had very high results or a strong return on their investment. Thus, compared to India, the UK is in nascent stage.

There are a handful of dominate actors in the overall m-payment systems and each actor has different opportunities and challenges to implement the service. Within the sector, there is a convergence among multiple industries that are becoming more complex in terms of m-payment solution delivery. Overall, though, the banks are the dominant actors for m-banking and m-payment; technology firms are the dominant actors in the m-digital wallet service.

Currently, banks view m-banking as a way to enhance services to existing customers. Banks are heavily involved in the sector as seen with the top banks launching not only m-banking, but also m-payment services. Yet, banks run the risk of other firms such as telcos gaining a foothold in bank's core capability of handling money transactions. As the Lloyds manager says about non-banks being in the sector:

> *They can facilitate payments and facilitate transfers but ultimately they don't actually hold the money in their accounts and that's where the banks, I guess, have a critical edge over the likes of PayPal and some other players in the industry.*

Banks still account for most m-payments with $6.5 billion out of $7 billion in 2011 (Batchelor, 2013) and is forecasted to rise to $15.3 billion out of $17 billion in 2013 (Capegemini's World Payments Report, 2013).

Conversely, the ability of these non-banking firms is increasing because the regulatory framework is allowing this to happen. As such, actors from the telecommunication industry are creating one core firm for the m-payment and the m-digital wallet space called Weve. Unlike in India, Weve is an example of how certain firms in the UK are combining their resources to become a dominant actor in the sector instead of fighting for the same customers. Weve is, in essence, a joint venture bringing together the capabilities of the UK's three largest telcos in order to create one single platform: EE (T-Mobile), O2 and Vodafone UK. This is helping to build a standardized process in facilitating payments with smartphones and PoS terminals. The partnership is inherently a single technical agreement that combines all their resources to create a neutral, device-agnostic platform. Weve's approach to this service is to disrupt the range of traditional business models from bank debit and credit card payments to loyalty card systems. In addition, the joint venture is looking to bring a greater role or sophistication to mobile advertising. Quintessentially, Weve will be using data mining techniques and other personal information on the customer. This will allow advertisers to specifically target customers and personalize advertisements. The hopes of Weve are that by 2014 the platform system will allow users to use a discount coupon via their phone at the register where users can collect loyalty points as well as pay bills.

5.3.2.2 Firms and other Actors: India

India is focused on creating interoperability even though they have additional actors, or players, to deal with because of regulation. As what NPCI has says:

> *See what is happening in most of the countries, particularly developing countries and the African continent, banking is not really strong, this is my perception. The people that are not strong so the payments there are not really evidenced by them. And the second thing is that there is no process of inter-operability but what is happening in India, it is a need of these other countries, so what we have done, we've created a private eco-system which is high tech, it has got a good thing from the telecom and a good thing from the banking side, so we see this system is working in this country.*

According to the Second Schedule of the Banking Regulation Act of 1949, banks in India are categorized as being either 'scheduled' or being 'non-scheduled.' Scheduled banks consist of banks listed in the Act as well as commercial and cooperative banks; while non-scheduled banks are simply banks not part of the Act. Further categorizations include banks that are public sector banks also known as nationalized banks and State Bank of India banks; private sector banks; foreign banks; and regional rural banks.

As compared to the UK, India has networks of agent firms within the service chain of m-payments. These include customer service points (CSP) and business correspondents (BCs). CSPs are individuals who act as agents on behalf of banks whereas BCs are firms that source and manage the CSPs on behalf of the banks. The NPCI manager describes BCs as:

> *So the banking correspondent is basically just an extension of a banking network, so instead of the brick and mortar bank branches can, you know, reach and therefore be, putting the penetration of banking services. So it would be anybody in the country, so one of them could be an operator, a mobile network operator because they have this traditional network but they only act on behalf of the bank. The consumer in this case is owned by the bank, so the operator or anybody else, third party, really provides the network from a distribution standpoint, for consumers to access banking services.*

Majority of these CSPs are in rural areas and villages. It is part of the financial inclusion agenda instigated by the government of India. As compared to other emerging economy countries' agent networks, CSPs in India are responsible for customer acquisition in addition to processing the transactions. The end-users are limited in using only one CSP for their payment needs, but most CSPs do not have actual stores to work in since they are moving points and roam. CSPs mainly deal with account opening paperwork while BCs and banks deal with account activation. BCs need to have a greater balance of capabilities since their work is very collaborative. Thus, time is of the essence and most CSPs focus on a single product because of time constraints as well as network constraints. Therefore, majority of CSPs just focus on m-payments and do minimal additional financial services. As a consequence, it is a challenge to even provide the simplest service because of the vast maze of India's financial architecture. Although, there is great growth of the CSPs agent network; it lacks a certain quality of their service that banks can directly offer, possibly because they are moving points.

5.3.3 Technology Infrastructure

Certain technologies progress towards technical as well as commercial maturity because of systematic interaction from a complex network of actors. Majority of the time, these technologies find success, but on occasion, these systems can fail and innovative products or services can get stuck in a certain stage of the innovative process. A sector, or industry, has a standard set of supporting technologies that face different demand conditions depending on the industry the firm comes from and their innovation process. However, technology and demand evolve over time, and hence, SSI will evolve and change to fit the new technological environment no matter what country the services are conducted in.

A mobile application is specifically designed to work with any operating systems of the mobile phone. Since an app is developed to the specific operating systems' capabilities, it can offer greater versatility as well as a richer sense of user interface as compared to a mobile browser. Yet, as much as an app is very functional, there are limitations to the process. For instance, the app must be programmed as a separate

function for compatibility for each mobile operating system, and there are many different operating systems. Therefore, for financial institutions, or banks, in order to develop apps have to take into consideration the pre-eminence and preference of Andriod, RIM or iOS platforms when determining which operating systems to accommodate. In consequence, this increases suppliers' time in trying to create a standard process since if one was to focus on only one operating system alone, then this overlooks the needs of two-thirds of other platforms, and hence, other potential customers.

There are various product and service potentials evolving from the mobile technology landscape in order to implement m-payment systems. A mobile phone such as a GSM mobile phone can send or receive information or data services through three different channels. These three possible channels are SMS, USSD or WAP. Depending on which channel is used will influence the way any m-payment systems are employed. Once the channel is chosen, the actual client application though can either reside in the phone, or it may reside in the SIM.

The rapid innovation of technology has been incessant to develop m-payment solutions. SMS is a text message service which enables short messages of less than 160 characters. These characters are then transmitted from a mobile phone and are stored and forwarded by SMS centres. The messages are either informational or transactional since it can provide information about the status of one's account with the bank, or it can be used to transmit payment instructions from the mobile phone. This is the basis of m-payment tools and is capable in serving the largest number of mobile users. USSD is a technological capability specifically for GSM phones and it is built into the GSM standard in supporting the transmitting of information of signalling channels of the GSM network. It not only is session based and oriented, but also transaction-oriented technology. Thus, the turnaround response times for interactive applications are much shorter for USSD than SMS. GPRS is a mobile data service available to GSM users that provides data for GSM networks. It enables WAP access services as well as internet access on mobile phones.

The SIM used in GSM mobile phones is what can be called a "smart card." Basically, it is a small chip that processes power and memory while information is protected using cryptographic algorithms and keys. It is more secure as compared to other client applications that reside on the mobile phones. Therefore, if the customer acquires a new mobile phone, only the SIM card needs to be replaced. However, if the app is already built into the mobile phone, then the phone needs to be replaced because an app is personalized. Nevertheless, this creates the ability to implement NFC. Ondrus and Pigneur (2007) discovered in the Swiss market that NFC creates more of an opportunity to make innovative applications such as ticketing and couponing. Although, not every smartphone can implement NFC since, currently, Apple has chosen not to include NFC in their iPhone handsets. NFC is the combination of contactless smartcard (RFID) and a mobile phone. This technology turns the mobile phone into a basic credit card since it enables phones to act as RFID tags or readers, and hence, becomes a mobile digitalized wallet. NFC is creating value-added services opportunities, but more so in the digital m-wallet space.

5.3.3.1 Technology Infrastructure: United Kingdom

In regards of technology application, the UK is more focused on NFC aspects as compared to India. However, as MH Invent's CEO, a security specialty firm, has said about NFC is that "….it's terrifically expensive and it's also fundamentally poor." The analysis about NFC is that it can communicate with other mobiles and quickly transfer P2P transactions, but it can also compromise these mobiles. All firms interviewed were asked if the future of payments is in NFC and response was very positive in saying it is, but with some hesitation. The Lloyds manager said:

> *The issue with NFC and probably why it's taken some time to get anywhere, is it is complex and its difficult and what you find is that, in theory it's a great service, but in practicality it doesn't look as great, as it should…. I think NFC will get to a point where it will be in every device, as ubiquitous as a camera, as a location for services.*

NFC can be used in a number of different applications besides just being a payment. It is most associated with just being a payment, but it is essentially a communication channel. For the future, NFC could eventually be used for security programming and

tracking information, especially on products. However, it is very expensive for merchants to accept NFC payment, and thus, it is still not an acceptable form of payment usage.

For the future, again MH Invent's CEO discussed the lack of standardization are about two specific issues: compatibility and consistency of communication. Technology has created multiple networks and now with 4G entering the market in the UK, devices have to be compatible for these newer network connections. This becomes a very expensive upgrade process. In order to have a standard compliance, it comes down to the location awareness.

5.3.3.2 Technology Infrastructure: India

For developing countries, previous research has indicated that technologies are acquired from developed countries and then assimilated and adapted by developing countries (Utterback and Abernathy, 1975; Hobday et al, 2004). Historically, agriculture continues to be a paramount industry for India. Yet, the country's quick adaptation to both endogenous and exogenous technological advancements explains the significant growth in the service sector where it has given the country the option of skipping the intermediate industrialization-led phase in transforming its economic structure. One of the core pieces of difference, though, between UK and India is the technology that consumers use. As the Head of Mobile Financial Solutions at Mahindra Comviva says:

> *…from a technology standpoint, it's a very interesting thing that I have been noticing, when I have been speaking to consumers across various consumer segments. People especially who do not have access to computers and are not really been as literate or just give me five minutes, it really seems that the mobile is, is for them actually, the mobile phone was a grand piece of technological event. And that is the clincher for the management.*

The m-payment system development in India is really owed to the IT and increase of ICT sector. The IT sector of India has been driven by many aspects such as the early development of a system of higher education in engineering and technical disciplines; creating an institutional infrastructure for science and technology policy-

making and implementing it; building centres of excellence; investments in public-funded R&D institutes and support of their projects that has attracted private sector investments; and a socio-cultural environment that supports the sustainability of these elements in the innovation system (Taganas and Kaul, 2006). Part of the first Five Year Plan (1951-56), India's emphasis was to develop a pool of scientific and technical manpower where the Indian Institutes of Technology, the Indian Institutes of Information Technology and the Indian Institutes of Management have become some of the country's premier education facilities. As a result, India has become a leading global scientific and technical manpower country.

It seems to be that the dominant technology for doing a simple transaction is via SMS transfer. For the last decade, SMS has been the most convenient and easiest way to conduct m-payments. Yet, as seen in the research, it is losing ground to new technologies or transfer processes because of the complexity of the codes as well as the high cost for both merchants and consumers. From the perspective of the end-user, SMS is a limited process because it is relatively inadequate in its ability to provide dynamic banking, but it does provide basic banking which is a core service for the un-banked end-users. For developed countries, there have been so many different systems of phones being deployed; it has taken awhile for countries to utilize an idea of having a standard system. Also, there has been incompatibility across networks which take years to resolve at an additional expense. The NPCI manager has noted that the process of using any platform is not necessarily restricted to smartphone usage in India:

> *No it's not necessary, the smart phone, the application new technology works there, if it's not a smartphone then we use the SMS technology. Every bank, we are putting bank offers onto the new technology, for banks, for the customers, for consumer choice to use whatever one they want but again this is an SMS based technology and it is a restriction of their lending.*

In 1995, 2G was introduced in India but deployment was marred by the initial costs which were exorbitant. By 2003, India was on the road to implementing 3G, but there were many obstacles in the way. One issue was lack of synchronizing with the global market. Previously, the Indian mobile communication market has been

captured by GSM, thus, it cannot be neglected that the logical evolution to 3G is to provide proper 3G spectrum allocations.

Overall, though, the Indian payment systems have various types of messaging formats specific for each payment system. Debit and credit cards have a certain level of standardization through the Payment Card Industry standards, but in terms of prepaid payment instruments such as semi-closed m-digital wallet, there lacks a similar standardization. Although, for banks, account numbers maintained are different based on each banks' requirements. Account numbers range from ten digits to 17 digits which bring about a lack of uniformity in account numbers. Thus, banks have to either mask excess digits or add digits in order to facilitate the payment process. India has not adopted the International Bank Account Number (IBAN) or Basic Bank Account Number (BBAN) that provides a format for account identification and contains validation information. IBAN and BBAN are based on a prescribed single standard procedure as well containing all the routing information needed for a payment to be transferred from one bank to another.

5.3.4 Knowledge and Learning

Knowledge is a key structure in a sectoral system and affects the innovative activities of the firms. As discussed earlier, because firms' differential capabilities to absorb and utilize knowledge at varying degrees, Malerba (2002) suggests that knowledge hold peculiar characteristics at the firm level. As Cohen and Levinthal (1989) identified that if advanced integration capabilities are necessary, then the sector may be dominated and concentrated by large established firms which it can be said is happening in both countries. As discussed in previous chapter of literature, knowledge encompasses tactic and codified elements. These elements relate to the problem solving activities of firms. However, it does not disperse automatically among firms; but instead, it has to be engaged by firms through their differential capabilities that are accumulated over time.

Literature in innovation suggests that firms learn about new knowledge as a function of the level of participation in collaboration; specifically that collaboration facilitates

the flow of knowledge among partners (Mowery et al, 1996). Knowledge of the consumer and technology can allow certain firms to become dominant players in the service chain. For m-payment systems, the actual service is provided by firms from different industries. The main industry is the financial service industry because these firms have the core knowledge about how to handle financial transactions, but what has been changing is that the firm who handles the transaction may not necessarily be the bank or other financial institutions. Instead the transaction could be handled by a telco or a technology firm. Indeed, these firms' core knowledge are in other areas which makes m-payment systems even more interesting to research since they are increasing their knowledge and learning from banks. Without a doubt, by learning new knowledge, these non-financial service firms are able to reconfigure their basic knowledge and achieve competitive advantage, which is increasing the innovation in m-payment systems.

5.3.4.1 Interactions of Knowledge among Actors

The sectoral system is characterized by strong contacts among firms, or in this case, actors, who have a higher capability to disperse technology that leads to innovation through interactions (Soofi and Ghazinoory, 2011). Many of the technology firms in this research collaborate with either banks or telcos to provide one of the three m-payment systems presented in this research. An important aspect to take away from these interactions is the differences among the actors in terms of knowledge and the influence on innovation. Indeed, Abramovsky et al (2004) conceptualized collaboration in the context of knowledge flows, cost and risk-sharing and public financial support. This study found a positive relationship between the external information flows, or incoming spill overs, and the likelihood of collaboration among firms for innovation.

5.3.4.2 Knowledge, Learning and Interactions: United Kingdom

In sharp contrast to the dire living situations that persist in India, the vast majority of households in the UK have available access to public infrastructure such as electricity, roads and landlines for telecommunication services. The data shows that firms in the SSI system have their own specific knowledge in which they are

applying to one of the three m-payment systems. By having the specific knowledge allows firms to be overly protective of what they exchange with other firms. As the Head of Mobile Banking for RBS discusses working with telcos, he focuses on the idea of m-digital wallets being negative:

> *The parasites out. This is where the MNO's (telcos) come in. To send that debit card information over the wires into the phones, needs to be a secure area, you think its data, the phone can't tell whether I'm surfing the web, it's just zeros and ones, it doesn't know the difference.*

Banks do not like the idea of telcos coming into the financial service arena. As far as banks are concerned, telcos should focus on telecommunication transactions only. It becomes another service for telecommunications to charge for such as wallets and banks focus on how consumers will grow tired of additional charges when they can simply use the bank for their banking services. Banks see that telcos are trying to formulate partnerships and collaborations with not just phone manufacturers, but technology firms in order to instigate more profits. The firm with the most common collaborations has been Monitise. Indeed, this firm collaborates with banks such as RBS and Barclays for the back-office solution, and other technology firms who offer services such as m-payments and m-digital wallets. There is knowledge exchange and learning going on, but the banks are very hesitant to collaborate in the UK. For India, knowledge exchange is stronger.

5.3.4.3 Knowledge, Learning and Interactions: India

Social context as well as reaching geographically remote communities is an issue in the m-payment systems for India. As seen in various firms, India is expanding their knowledge in this process. In regards of dealing with the financial inclusion or un-banked population, India has better knowledge than the UK. The regulatory policies in India have almost forced a knowledge exchange. As what Induslnd Bank says:

> *The reason being, that kind of segment which the Reserve Bank is asking us to address are not accustomed with the mobile banking habits - that would be number one. Number two, the nature of their expectations and nature of their product requirements is very much different from what traditionally banks in India have been offering. So at the same time customising the banking requirements towards this segment requires a huge amount of last mile breach*

and understanding and infrastructure, which normally banks will find it challenging to address. It is the kind of segment here in India, the poor segment, the rural segment, particularly such kind of customers where you will have big volumes, small ticket transactions.

For banks, it is easier and more profitable to handle higher value transactions even if they are minimal instead of more transactions at minimal value. Since regulation is requiring banks to include the unbanked, banks are trying to find a balance of providing services to that specific segment. However, it is a time consuming process to find that balance and technological capability. Thus, banks are working with others who have the knowledge and resources to share in the responsibility. The firms who are becoming the leaders in this segment are really the micro-financial institutions in offering credit.

5.4 Business Models in the United Kingdom and India

The business model represents the strategic choices of actors and firms in generating and capturing value of innovation (Chesbrough and Rosenbloom, 2002). Thus, the business model is the product of the innovative service and how the product or service offerings are applied. The business model is closely related to alliances and collaborations, especially a firm's ability to collaborate. Having the right business model with the right service delivery for customers is a core resource for all firms involved.

Initially, when mobile commerce and payment solutions started to emerge over a decade ago, a multitude of business models emerged. As seen in previous research, several m-payment firms as well as initiatives in the EU have failed or discontinued (Dahlberg et al, 2007). Evans (2011) analyzes the consequence of innovation if the business models are converted to where the merchant pays as well as the customer pays. He postulates in which the shift in business models could possibly hinder the emergence of new payment systems where the innovative service, in essence, becomes chargeable in specific areas of the service chain.

In either country, there are potentially four m-payments business models that each firm can utilize, but there is no dominant model that can be transferred on a global

level. These four models are the operator-centric, bank-centric, peer-to-peer, and collaboration model. In the operator-centric model, the telco acts independent from the other firms in the service chain and deploys the mobile payment applications to the enabled phones. The applications can support a prepaid stored value model or the charges are integrated into the customer's telco bill. In the bank-centric model, the bank deploys the mobile payment applications and ensures that merchants have the PoS acceptance capability. Payments are, thus, processed over the existing financial networks to the appropriate accounts. In the peer-to-peer model, an independent service provider supplies secure mobile payments between customers or between customers and merchants. Finally, in the collaboration model, this model involves cooperation amongst banks, telcos and other service providers or stakeholders in the mobile payments value chain. In addition, this model includes a third party firm that manages the deployment of mobile applications and payments are processed over the existing financial networks.

In analyzing the firms' business models there are really three kinds of models being employed. These business models are bank-centric, peer-to-peer integration model or collaboration model. Thus, operator-centric model, although discussed in previous academic research (Pousttchi et al, 2009; Haaker et al, 2006), is not being used as consistently, and was not showcased in any of the firms for this research. One of the main reasons why that particular model is not being used is because regulation simply will not allow it. Table 5.1 indicates the percentage of business models of case-firms only.

Business Models	Percentage (%)
Bank-centric model	31%
Peer-to-peer model	15%
Collaborative model	54%

Table 5.1: Business Models

As the Eko marketing manager elaborates in regards of collaboration and strategy:

> *So the business model is based on collection of fees from customers, who value the service for the convenience and the ease and the speed, with which money can*

be transacted and cash can be either electronisised or the other way round. Electronic money can be converted into cash, that's the principle service that is being delivered and the business model is from share of fees income that is generated as a result of customers paying for these services.

Interesting to note that firms in the UK did not discuss collaboration aspects, although it is there in terms of technology and knowledge exchange. As what Idea Cellular in India says "…right now people are just, they're just focusing their attentions on trying to get the correct business model." Instead, whether from bank, telco or technology firm perspective, whatever business model they utilize, it comes down to the cost and revenues involved. Indeed, any kind of m-payment system is changing the opportunities for the firms involved and their strategy, and business model needs to evolve with those changes. As what the Lloyds manager says:

Of course, I think most banks haven't even realised the opportunity for mobile banks, there are so many opportunities to make money. It's the traditional revenue streams that you can make money through, like I mentioned earlier; increasing sales, incremental sales, incremental transactions or incremental interactions with your brands as a bank, through mobile should lead to more and so those sort of traditional revenue lines, this cost production revenue lines around moving people into mobile, which by and large is the cheapest channel to service at the moment.

Business models are evolving with the technological advancements in the payment arena. For banks, it is more about reducing paper and reducing the management of costs involved instead of focusing on launching new services. Since banks seem to be more focused on cost reduction, non-financial service firms are gaining a foothold in this innovation and service. These firms are identifying new opportunities as well as new revenue streams. There are more to m-payments than being a cost reduction. Thus, business models are becoming innovative and will be discussed in more detail in Chapter Seven.

5.4.1 Patterns of Demand

In certain sectors, demand can be relatively slow or it may fluctuate more rapidly resulting in turbulence of the overall system. As part of business models, demand is a situation where strategy is used to overcome either the lack-of or the increase-of customers. Most m-payment systems cater to customers' necessities where demands

tend to be inelastic, and hence, the role of new technologies becomes crucial because it can help firms improve the quality of the products or quality of the innovation. This, in hindsight, changes the demand conditions of the services. Also, demand patterns can change the product and service by offering new characteristics in the existing products (von Tunzelmann and Acha, 2005).

With the only the three business models being utilized in the two countries, there are already patterns of demand emerging. Inspired from Pavitt's (1984) taxonomies that influenced Malerba and Orsenigo (1995) and Guerzoni (2010), there are four sectoral patterns of demand. These patterns include: passive markets, mass markets, niche markets and dual markets. Passive markets are small market size in terms of users where there is low user sophistication and firms are not encouraged to innovate. The mass market is something that is more common in India, but it is where products are standardized and used by many consumers. The market is large, but because the products are mostly commodities there is lower user sophistication. The mass market pushes firms to innovate as a cost reduction in their process. Niche markets are small market size because niche customers discourage firms from investing in process innovations. There is high user sophistication and greater involvement from customers in helping the firm develop innovative products. Finally, the dual market is large market size and higher user sophistication, but there are two types of firms. One firm will focus on more process innovations and produce products for a larger number of customers; whereas the second type of firm focuses on niches by providing product innovations for sophisticated consumers.

5.5 Conclusion

This chapter has discussed the framework for understanding the development of m-payment systems from the UK and India. M-payment systems were described in detail in order to give a better understanding of the systems. The concept of SSI has been useful in understanding the struggle for obtaining success for these firms especially in comparison between a developed country, the UK, and an emerging economy, India. In particular, SSI has helped in seeing how the competence of the characteristics in the system interact with each other and influence the uniqueness of

the innovation for m-payments. The aim of this chapter was to show how the network of firms and institutions cooperate in a sector and how the sector is affected by specific technologies. Regulation affects both countries, yet, governmental policies are different when it is applied to similar services. The next chapter, Chapter Six, will go into more specifics in regards of the innovation process of the firms involved in this research as well as offering greater details of the characteristics of the firms through 13 case studies.

Chapter Six: Data Presentation of Firms

6.1 Introduction

The previous chapter, Chapter Five, discussed the SSI of the two countries in the context of m-payment systems, and also presented the business models being utilized. Chapter Six is the second of the data presentation chapters. This chapter will present the data from the firms in the form of case studies through a systematic process. By following this process of sifting and sorting data according to key issues and themes, an in-case analysis will be presented in this chapter. The synthesis and interpretation of data and interviews is mapped between linkages, concepts and across themes to decipher the drivers of innovation in order to help answer one of the main research questions. Whilst the identification of themes has helped organize the data better, it is important to note that some of the emergent categories were not mutually exclusive to one country or the other. In defining the innovation and process for this particular service, this did not fit discretely into any one set category, but across a number of categories.

The chapter is divided into three parts. First, it describes the firms selected for the cases. Second, it presents the data of the selected case studies. Finally, the third section showcases the conceptual framework of the research through case analysis by presenting the drivers of innovation. These drivers are the following: supply, demand, regulation and technology. However, before firms are discussed and presented, service characteristics and innovation processes will be considered.

6.2 Service Characteristics

As mentioned in the literature chapter, there are four key characteristics of services that differentiate it from physical goods: intangibility, heterogeneity, inseparability, and perishability (Lovelock, 1983; Zeithaml et al, 1985). Thus, one can take these characteristics and see how they apply to the innovation of the firms discussed in the in-case analysis.

6.2.1 Intangibility

Intangibility focuses on the nature of the service act and receipt of the service act (Lovelock, 1983). Intangible services are actions toward other intangible assets such as banking or other financial type of services. This can be seen in many of the banks in both countries, and specifically for India the business correspondent agent network.

6.2.2 Heterogeneity

Heterogeneity describes the degree of the service uniqueness provided to each consumer. It is present more when services vary from consumer to consumer such as financial services being customized to deliver financial goals for each service client based upon individualized consumer objectives. Contrasting to homogeneity, heterogeneity infers that there is a high degree of service consistency; for example a standard quality and consistent service delivery. Since services are heterogeneity, there is a lack of global standardization (Sorenson and Wiechmann, 1975) because services react to globalization in different ways due to the particular process of creating and delivering (Lovelock, 1999). For m-payment systems, each service transaction is unique for the specific customer's needs because of the heterogeneity of customer preferences and transaction environment.

6.2.3 Inseparability

Inseparability refers to the simultaneous production and consumption of goods the customer is involved in the process as co-producer. In contrast, separability focuses on how the customer is not involved during the service production and is not present during the service consumption. Services that are separable can more easily be internationalized. However, there are more aspects of inseparability within the mobile payment systems because some services lend themselves to separation of the production and consumption process as well as separation between the supplier and customer.

6.2.4 Perishability

Difficult to define, perishability is basically a service that may not be captured, or the services can be stored for later use. Therefore, the creation of the service product may, and can, take place at a different time from service consumption. Indeed, for m-

payment systems, time and consumption is core especially when the transfer of money is of the essence to the speed of the transaction.

6.3 Service Innovation Process

In deciphering the process, Zaltman et al (1973) focuses on how initiation will lead to implementation which leads to institutionalization, and finally to a process of a routine. Thus, as what Utterback (1971) argues that the innovation process is reflected in the improvements or introduction of new production process for services and may involve technology. In services, there is an actual process that takes place that is becoming more innovative with the addition of technologies. The process involves many players or actors in implementing the actual service. The buyer, or end-user, and seller, or supplier, goes through three processes of the service: an agreement, a payment or transaction, and a delivery. Somewhere within these processes, services become innovative and new. Even for m-payment systems, the innovation aspect deals with more product innovation, but the services are creating new markets. Figure 6.1 depicts the parties involved in the service exchange between customer and merchant (Karnouskos and Fokus, 2004).

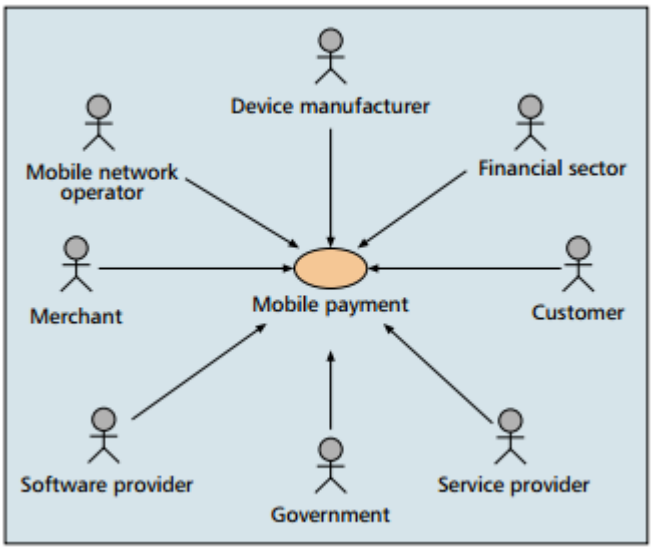

Figure 6.1: M-Payment Players
Source: Karnouskos and Fokus (2004)

The merchant acts as an intermediary between the user and the m-payment provider. In addition, the transaction between the m-payment provider and the user involves

other players in the back-end of the process. The device manufacturers produce the mobile phones that are used by the end-users. These players control the technology and capabilities of the final device where it affects the implementation as well as the deployment of the m-payment services. The telcos control the wireless network and through their large client base, they influence all parties involved in the ecosystem. However, they cannot be fully responsible for handling every point in the service because they have limited experience in payment services; banks have more knowledge, experience and understanding of the complexities of financial transactions (Laukkanen and Lauronen, 2005). The technology and software firms provide infrastructure by producing standard compliant software/technologies that connects the different parts of the m-payment process. Finally, the last player, the government, is indirectly involved with m-payments, but they set the policies, standards and regulations for the other players in the ecosystem. In order to ensure that m-payments are successful and efficient, all the players must cooperate and stay open-minded to the development of new technologies and models (Karnouskos and Fokus, 2004).

6.4 Characteristics of Firms

The following Table 6.1 presents information on the interviewed firms; not the case firms. The table shows the country of origin as well as the countries of operation for a particular service. As discussed in the previous chapter, the service could be mobile banking, mobile payment or mobile digital wallet. The products listed are what the firm either provides or is somehow involved in creating whether it is the front-end or back-end of the process. Only a few firms are actually involved with all three of the m-payment services, but this list will change in the future. For example the firm Tesco Bank could eventually offer an m-payment solution, but as of 2012 and the time of the interview, they have not begun to offer any of these products.

Firm	Company	Country of Origin	Industry	Public or Private	Countries of Operation for service	Product Service (m-b, m-p, w)
1	Standard Charter	UK	Finance	Public	Global	m-b
2	Nokia Siemens Networks	Finland	Telecom-munications	Public	Global	m-p
3	Tesco Bank	UK	Finance	Private	UK	none
4	TIBCO Software Limited	US	Software Technology	Public	Global	m-b, m-p, w
5	Monitise Group	UK	Software Technology	Public	Global	m-b, m-p, w
6	Royal Bank of Scotland	UK	Finance	Public	Global	m-b, m-p
7	Sainsbury Bank	UK	Finance	Public	UK	none
8	Lloyds Bank	UK	Finance	Public	UK	m-b
9	Barclays	UK	Finance	Public	UK	m-b, m-p
10	National Payments Corporation of India (NPCI)	India	Finance	Public	India	m-b, m-p
11	Atom Technologies	India	Software Technology	Private	India	m-b, m-p, w
12	Eko Indian Financial Services	India	Finance	Private	India	m-p
13	Mahindra Comviva	India	Telecom-munications	Private	Global	m-p, w
14	Induslnd Bank	India	Finance	Private	India	m-b
15	HDFC	India	Finance	Public	India	m-b
16	Idea Cellular	India	Telecom-munications	Public	India	m-b
17	CITI Group	US	Finance	Public	Global	m-b
18	iKaaz	India	Software Technology	Private	Global	m-p, w
19	Beam Money	India	Software Technology	Public	India	m-p, w

Table 6.1 Background of Interviewed Firms

Case	Firm	Supply (providers)	Demand (customers)	Regulation (Policy, Legislation)	Tech-nology
1	TIBCO Software Limited	Middle-man	Banks, third-party developers	Does not fall under regulation	Platform hosting
2	Monitise Group	Middle-man, platform host	Mainly works with banks, credit cards	Does not fall under regulation	Platform hosting
3	Royal Bank of Scotland	Bank	End-users	Financial	App
4	Lloyds Bank	Bank	End-users	Financial	App
5	Barclays Bank	Bank	End-users	Financial	App
6	NPCI	Work behind the scenes from sender bank to receiver bank	Banks	Umbrella institution for all retail payment systems; creating standard business process	IMPS solution; platform (P2P, P2M)
7	Atom Technol-ogies	Platform hosting; in the middle of the process between banks to merchants	Govt, private sector, banks; end users will depend on tech options/payment options	Certain financial	Web hosting/ tech support; m-commerce; IMPS operations (P2M, P2P); IVR
8	Eko Indian Financial Services	Middle-man	Banks	Financial	agent network; patented low-cost password generator
9	Mahindra Comviva	Middle-man in the process	Mainly telcos	Telco	Platform; NFC or QR codes
10	Induslnd Bank	Bank	End-users	Financial	App
11	Idea Cellular	Platform host; BC	End-users	Financial; Telco	financial inclusion platform; BC
12	iKaaz	Middle-man in process	Merchants, BCs, telcos	Telco	platform for merchants, BC
13	Beam	(like Paypal)	Merchants, end-user	No regulation	Mobile payment service

Table 6.2 Drivers of Innovation

6.5 Data Presentation of the Case Firms

The background of the sampled case study firms are presented above in Table 6.2. The table includes the drivers of innovation for the 13 sampled case study firms. The table is examined theoretically and guided by the preliminary conceptual framework in order to formulate themes as the drivers of innovation. As mentioned and described in Chapter Four how the categories were formulated, the drivers of innovation are supply, demand, regulation and technology. The table offers a snapshot of the firms and aspects of their innovation process. Detailed discussion of each case-firms' innovation process is described in more detail in the in-case analysis section.

6.6 In-Case Analysis of Firms

This section discusses the firms' drivers of innovation using in-case, thematic analysis. Each case is divided into four sections the main drivers of innovation. These sections are supplier, demand, regulation and technology.

Throughout the data collection, it has been discovered that one of the main drivers of innovation is the supplier or the provider of the service or services. The data showed numerous firms either have the final relationship with the end-user or have relationships with other suppliers in the ecosystem. Another driver is the demand side of the innovation process, which is not necessarily created from the end-users, but by the suppliers themselves. In this research, when discussing demand it is from the perspective of the customers and consumers. For each firm profiled, customers are different for almost every case because each firm provides an aspect of the overall service process. For instance, the majority of the banks, their consumers are the end-user, whereas the majority of the technology and software firms, their customers are either other merchants, banks or telcos. It depends on the business model the firm utilizes as well as what industry the firm is from.

Regulations sit across a variety of bodies and rarely do these government bodies have a focus on mobile payment systems. However, there are general guidance about how to communicate with customers and merchants. Yet, the relationship between

regulation and policies with innovation is complex as well as dynamic. Regulations are different in the UK and India, thus, it causes the innovation process to be different even if supply and demand are very similar. Banks and other financial institutions are, at times, constrained by regulation, whereas other players in the ecosystem like telcos are not necessarily limited to the same regulations as financial institutions. Although the populations of the two countries are vastly different, India lacks a national system of identity cards, which affects the aspects of regulation as well as the innovation process. For both the UK and India, approaches to regulation have been dissimilar. India takes a more conservative approach with the conclusions that consumers and merchants need to be protected. For the UK, regulation is more relaxed since there is no specific mobile payment regulatory response.

The last theme is technology. Specifically, communication technology has been a core aspect of the innovation process and what makes the service become innovative. As the ecosystem as grown in both developed and emerging economies, technologies have advanced where the financial industry is witnessing new entrants of intermediaries. Firms, though, have different aspects of the applications at their disposal for interacting with their customers. However, no matter the country, new technology can be limited and there has to be a distinction of mobile payment usage. The specifications of technologies for m-banking are SMS text, mobile browser, custom applications. For m-payment technologies NFC companion devices embedded NFC, SMS text and voice. Overall, technologies are either specific for mobile payment system or are used in both banking and non-banking services. However, payment systems can be bundled together with other processes which create confusion and slows consumer acceptance.

Keep in mind that many of the firms in the case studies below offer many services besides just an aspect of m-payment. Although many of these services are important for these firms, specifically for this research, descriptions of services and technologies relating to m-payment systems will be discussed because it impacts their innovation process.

6.6.1 Firm 1: TIBCO Software Limited

6.6.1.1 Supplier

TIBCO Software Inc, an American firm founded in 1997, is a software vendor and technology provider for companies who use on-premise or cloud computing environments. Their software integrates the server-side, processing rules and transactions across multiple channels and multiple payments, rewards and loyalty instruments. The company focuses on capturing data mining aspects since it has the capability to capture the right information at the right time. They work behind the scene within the innovation process of m-payments. Thus, they either partner or are the service providers for other firms who have the final relationship with the user.

6.6.1.2 Demand

The company works with other companies from various sectors. Specifically, in the m-payment segment, TIBCO works with banks and telcos on a global level. Banks like TIBCO's capability to handle high-transaction volumes in real-time, speed time-to-market with new functions, and deliver end-to-end visibility. When asked about the challenges a software vendor faces in terms of demand for the service, the engineer interviewed alluded to the technology challenge as well as obtaining a sustainable business model:

> *One of the biggest challenge of mobile payments is that it often addresses low value payments, also meaning low revenue per transactions. If you want a sustainable business model, you then need to process higher volumes of transactions, more transactions, less revenue per transaction.*

In other words, TIBCO is focusing on how to improve scalability in m-payments with technology. They are trying to focus on reducing the cost per transactions, but it is a big technological challenge. Also, it is an operational efficiency concern, hence why business models need to be adaptable to these innovations.

6.6.1.3 Regulation

Although not directly affected by the same regulatory aspect of other firms in the m-payment ecosystem, it views that firms in emerging economies can often move faster with new technologies because these countries have the legacy infrastructure of older

technologies. Additionally, there are fewer government rules and regulations about what companies want to do in these developing countries.

6.6.1.4 Technology

The 'TIBCO Payments Orchestration' is an open and flexible mobile transaction processing solution that allows mobile network operators, service providers and financial institutions to deliver mobile airtime and money payment services such as airtime recharges to goods and utility bill payments. It integrates readily with external systems and networks as well as provides the capabilities needed to rollout innovative mobile payment services. It has a portfolio of application processes that act as templates to build business-specific mobile solutions. Their 'TIBCO ActiveSpaces Transactions' is an in-memory transactional application server that is ideal for demanding mobile payment. The software creates other real-time applications and is also cost-effective.

Overall, technologies have been around for awhile, yet not everyone has figured out how to use those best which creates opportunities. As the engineer said:

> *[M]obile payment is still an emerging and un-structured market, with small and big players coming in and trying to get a portion of the cake….I think this market is still immature enough to leave space for new entrants. No one except in very few countries has yet gained a place dominant enough to close the doors to competition. However, going forward, I think the market will naturally de-fragment with a few winners left in each geography. For a mobile payment services and more generally payment service to succeed, you need to build up a large acceptance network, big enough for customers to naturally join.*

Mobiles are being viewed in a different light because of innovative aspects like cloud computing. Cloud has created a sense that loss is no longer an issue because data is protected, and hence TIBCO has used their resources and capabilities to provide aspects of the innovative process of the mobile payment service. Generally, cloud hosting and cloud computing systems are designed for scalability in order to support large numbers of customers as well as surges in demand.

Moreover, TIBCO is focused at providing an advantage over competitors with the idea of making quick decisions based on how much data a company has on a consumer. Although decisions can be automated, at times, TIBCO is good at pattern analysis through their collaboration with other firms. It is not necessarily about the technology, but the innovation that can be created with developing the right mix of functions within the various business models. When asked about the m-payment services being cost effective, the response was interesting considering they are from the software vendor perspective. The engineer said:

> *It surely is, but this is the classical build versus buy debate, that we, as a software vendor, have to challenge on a regular basis. I don't think "profitability" is the right word yet, but I don't think anyone working in payments today can ignore mobile. And mobile will undoubtedly become a key and profitable instrument in payments in the short term.*

M-payments are still an unproven market in the UK. It is not cost effective yet and technology has not reached maturity. In order for a payment scheme to succeed, firms, and not just technology firms, need to create a mass market large enough for usage to become the dominate service for payment transactions. Thus, firms need to attract and create value with other firms; in other words, collaborate. Through collaboration, the business model has to be structured in such a way that all benefit and not just customers.

6.6.2 Firm 2: Monitise Group

6.6.2.1 Supplier

Founded in 2003, Monitise Group is an UK-based technology company that focuses on m-banking and m-payment solutions. Considered one of the fastest growing technology companies, Monitise had spent three years developing mobile banking software before they had their first client. Monitise caters to processing the capabilities of other firms, and it has been difficult for them to convince competing banks on the idea of a single platform. The single platform concept is very similar to that of the ATM network. Their capabilities work with tech firms from the m-commerce ecosystem to create a cross-industry hub as well as monetisation of data.

They are the centre of the m-money solutions and work with banks, telcos and other payment providers.

Monitise was one of the very first companies to develop the resource and capabilities in the early stages of m-banking and m-payment systems. There have been very few with an approach to the m-payment space that has ultimately proved effectively. There suite of SMS and mobile web-based services can be used across several areas of payments and banking. Their business model focuses on being one of the main players, or central figures, in the m-payment ecosystem that is accessible by consumers using any bank, telco, phone, and any other agent.

6.6.2.2 Demand

Monitise works many different players on a global level, but these players are mainly within the financial industry. Specifically though, Monitise, designs and runs software platforms that help telcos and financial firms with three types of service. These services are mobile banking, mobile payment and mobile commerce such as digital wallets. They are digitizing exiting payment rails, or processes by which consumers pay using plastic for the mobile segment. In addition, through joint ventures and licensing deals, Monitise has expanded their services globally in both developed and emerging economies. Although the firm does not reduce traditional revenue streams, it charges clients with set-up fees in addition to per-user basis as well as additional income from loyalty schemes.

They require smart partnering in order to complement internal systems with specialist capability and network connectivity. They provide mobile payment platforms for credit card companies as well as many banks in the UK. In 2009, Monitise signed a strategic relationship with Visa. This partnership expands Monitise's mobile services and creates a position for Visa in the mobile space arena. Visa took Monitise's resources of their banking model to apply to payment cards. However, they do not have the final relationship with the end-user and thus, are more behind the scene workings in the innovation process.

6.6.2.3 Regulation

Although not directly affected by regulation, Monitise's global expansion has been limited due to the challenges of the different regulatory requirements as well as other joint venture firms' own technology capabilities. Since Monitise works in a very technology heavy sector for mobile payment service, their regulatory concern is more or less about market dominance and unfair competition, yet the number of users for mobile payment systems still remain low enough to where market dominance has not been a concern.

6.6.2.4 Technology

Monitise service is based on a multi-point solution to defend and extend the banks role in payments through what they refer to as maximizing deep engagement. For them, it is about built in customer service approach as well as smart partnering as they work behind the service process and connect to bank and telco platforms. They have created a built-in customer service approach to technology that connects third party firms to bank and telco platforms. Their innovative tech is the Mobile Point-of-Sale (mPOS), a mobile payment service. It helps banks, telcos and acquirers the ability to accept card payments on a mobile device. Also, it helps merchants to manage money from one secure location to another. It can be a standalone solution or be integrated into an existing mobile service since it is a complete mobile payment solution for all businesses of all sizes. The system focuses on chip and pin, chip and signature or swipe payment methods.

Their Accode services is based on a secure application that is stored on the mobile phone that uses secure algorithms to generate a one time passcode which can be used to secure access to desktop and online services. This tech is always on since it has online application plus offline capability. This allows the service to work in areas with no cell coverage. It can also be customized with the customer's brand, thus, reducing the barriers to employee adoption.

In 2011, Monitise was awarded an UK patent in creating a "virtual payment card." This card enables consumers to make payments with merchants in shops and online

by using their mobile phones without divulging their card details. Thus, this virtual card acts like an m-digital wallet with a prepaid digital voucher for a fixed amount or for a specific period. By avoiding having to share credit and debit card information when purchasing goods and services, this has been an innovative concept and pursuer to a semi-closed loop m-digital wallet.

6.6.3 Firm 3: Royal Bank of Scotland

6.6.3.1 Supplier

Established in 1727, it is currently partially owned by the UK government.

6.6.3.2 Demand

RBS has the final relationship with the consumer. Many of their apps are created for m-banking and m-payment with focus being on customer engagement. M-banking gives the bank a higher engagement level than any other forms of interaction with the consumer. Although banks are traditionally conservative in regards of innovation, RBS is trying to increase their customer engagement with interactive technology. The cost of development, the launch, and the marketing is substantial for the bank because this is not their usual capability. Thus, it runs the risk of having the technology copied and imitated by other banks.

When discussing with the Head of Mobility competition, especially from credit card firms and telcos, this is what he had to say:

> *Because some phones come with a built in secure area and of course there are secure areas on the SIM, the mobile phone companies want the secure stuff to be on this SIM because they control the SIM and they control access to it and they want to charge us for putting something on that SIM and they're the only ones that have the keys. Because they want to make their own wallet, "02" have done a wallet, "Orange" have got a wallet and they put the safe stuff, in that secure area, on the SIM that they control, because they don't want to get cut out the thing either. They want to actually charge for sending this information over the wires, because they could make money. Were constrained everywhere making money, so we'll make money doing this!*

Although the impression was that banks are not concerned about other players within the m-payment system, these other players are becoming more dominant. They are

adding more value to their services, yet RBS feels that no matter what, people still will use banks. RBS believes that people will always need banks no matter if mobile phone manufacturers or mobile phone suppliers are extending their services and knowledge in this arena.

6.6.3.3 Regulation

Since there is no general guidance on m-payment systems in the UK, the service sits across a variety, and rarely specifically, states m-payment or m-banking. There is general guidance within communication with customers, data storage and banking fraud.

6.6.3.4 Technology

RBS is trying to showcase overall integration through the usage of unique mobile capabilities that afford differentiated service offerings. The integration across delivery channels provides consumers with seamless access to services. The application and functionality of it is replicated from their online services. Through the RBS website, the customer enters their mobile number. Then the customer receives a text message where the customer downloads the app onto their phone. Finally, an activation code is mailed to the address on record within three business days. Once the passcode is received and entered, then the customer can transfer monies to others who must have a RBS/NatWest app or who has a valid UK visa card.

The extra benefit for the customer is that as of now RBS is the only bank where the customer can receive cash from any NatWest, RBS or Tesco cash machine without using their debit card. They can pay bills or people, but an online payment must be done beforehand. Their GetCash app deals with the transfer of money from one individual to another. In order to calm fears about fraud, each code is only valid for three hours. The recipient will receive a text which contains a link to a secure Visa website. They then have to put in their card number and the amount into the site in order to get the cash.

When asked about the future of m-banking and m-payments, specifically NFC, this is what the Head of Mobility had to say:

> *If I can do NFC, then what's the difference from a credit and a debit card, it's just the timing in the payment but if I can connect the bank and the debit card system directly up to those terminals, then debit and credit have a different meaning, it's just does it come straight out my bank account or does it wait thirty days to come out the bank account.*

According to RBS, NFC is an innovative process, but it is not necessarily an innovative service. NFC allows one to be better organized, but from the bank's perspective, an innovative service has to be disruptive to the point that it completely replaces the bank, and they do not see NFC as being a disruptive technology. They view and compare NFC as a more costly credit card to where the credit card companies should be worried about being replaced.

6.6.4 Firm 4: Lloyds Bank

6.6.4.1 Supplier

Originally established as in the UK as Lloyds Bank in 1765, the company merged with TSB Group in 1995 to form Lloyds TSB. With the acquisition of HBOS in 2009, it was renamed Lloyds Banking Group where by 2013 the bank's name was be re-branded as Lloyds Bank. When asking about Lloyd's infrastructure, the Manager of Emerging Technologies, Customers Brands Digital and Telephone Banking discussed the competitive challenges in the banking industry, but he alluded to the "RBS problem" where in the 2012 RBS had a number of IT issues concerning m-banking and online banking. The "RBS problem" has also been mentioned in interviews with others. It is something that all banks are aware of, and certainly, try to avoid. As what the Lloyd's manager discusses:

> *So what's going to happen is that most banks will offer a core set of similar services and banks will start to evolve and differentiate their services and therefore there's going to be a lot of investment, new innovation and partnering with different; just innovation and change and I think things like security, obviously they will cost money.*

With m-payments, security is a big concern and when the security gets compromised, then customers have to be aware of how much of their personal information becomes

a public domain. As such, the "RBS issue" is a problem that all banks are trying to avoid when they create an innovative service. M-payments have not reached saturation in the UK and there is a lot of competition with just the banks regardless of the other players in the system. Competition is becoming fiercer; however, this is creating more innovations and new financial infrastructures.

6.6.4.2 Demand

Banks are different from other mobile payment platforms because they can facilitate payments and deposits. This creates a critical edge over companies like PayPal and other players. There is no limit to the amount one can transfer. Part of the support chain of the ecosystem has security built into the technology. The Lloyds manager predicts that Lloyds should be able to increase their services by offering combined deals. Mobiles will become more relevant and in more demand for users. Mobiles are not just a communication tool anymore and banks need to exploit the opportunities that mobiles can create.

6.6.4.3 Regulation

Lloyds wants regulation to be the same for everyone involved. In other words, if firms from other industries are to compete with banks in providing similar services, then all the firms should fall under the same regulation umbrella. As what the manager focuses on:

> *Ultimately regulation impacts customers, in my opinion, potentially to a more convenient or innovative service. I guess it's also there to protect them, so I guess I've seen a lot of cases recently where banks have abused that and I therefore regulation was required. From a banks perspective then, to me level playing fields, so everyone is impacted by the same regulation.*

Regulations are part of the industry, and from the banking perspective, banks have a stronger ability and knowledge to handle the requirements. Banks basically want the same regulations for all the actors involved in the service. Although m-payments are an innovative service, regulation will impact revenues and it is not a competitive advantage. Thus, banks want to make sure that regulation does not turn into a competitive advantage.

6.6.4.4 Technology

Lloyds has restructured their m-banking service in the last four years in order to provide "Galaxy." The app is similar to online/web banking, but in order to send money to a new recipient, this involves Lloyds calling the customer to authenticate their request and ask for a number that is on the screen of the phone; similar to aspects of RBS process. Additionally, the customer can check their account balance, make payments and transfer money between accounts. A variety of technologies have either been integrated or purchased for the platform into Lloyd's system. The system manages all the different processes and rules to govern how money is moved and transactions made within different amounts/limits, and different customer segments. It is an offshoot or coil attachment to mobile service. Lloyd's strategy is around breadth rather than optimal user experience. Essentially, the service is predominantly produced in-house and integrated with a number of different technologies.

In terms of implementing NFC into their system, this is what the manager responded:

> *So there's been a lot of talk about using NFC for eventually opening a door, for security for, you know, tracking information, also for information, so you could tap it on clothes that had NFC and it could tell you all the information about those clothes. I think NFC has a number of applications; they seem less compelling now for payments, especially in mature markets like the and abundance of existing point of sale infrastructure. So in emerging markets where they might be investing, such as India or Africa, where they might be investing in first set of point of sale infrastructure, where NFC contacts the space terminal, make sense to move to. But in the UK we already have a signature gap; we already have a saturation of non-compact as terminals and it's such an expensive overhead for businesses to move to, and that's always been the chicken and egg scenario with NFC's. Until you have terminals that accept the devices that work…*

It comes down to service transactions. NFC will become more dominant when terminals become more common. However, in regards of the service, banks need to focus on the cross-selling points of the transactions. M-payments are a service element and in order to increase the usage, then banks need to create the need for the

service. Currently, users are using m-payments as incremental transactions. Thus, banks need to market the service to users in order to increase the transactions.

6.6.5 Firm 5: Barclays

6.6.5.1 Supplier

Barclays was founded in 1690 in the UK and through various mergers by 1896 it became known as Barclays. Historically, Barclays has been one of the leading innovative banks for banking products. This can be seen with the launch of the first credit card in the UK as well as the first cash machine in the 1960s.

6.6.5.2 Demand

Barclays' m-payment system "Pingit" launched in 2012. It was initially marketed to retail users. It is now being promoted to corporate and business customers as a means of facilitating customer payments. When asking about the future demand and cost effectiveness of m-banking and m-payments, the Vice-President of Mobile Payments was short with his response of "[C]annot tell if mobile payments is cost effective since there is an option to go online so nothing changes." Thus, for the UK, the technology is still new and being designed within the service context that firms do not know when the investment in the technology will earn a profit.

6.6.5.3 Regulation

The bank is required to follow the financial regulations as stated by the UK government. In terms of m-banking and m-payments, this is what the vice-president alluded to the idea that banks simply need to focus on the 'know-your-customer' policy:

> *Mobile payments you can legally, you can ask for people's numbers in order to make a payment as long as compliance check of KYC (know your customer) and as a bank you need to have a complete view of who is making the payment and who is receiving it to avoid money laundry.*

Banks have had to always deal with regulation. Regulation is nothing new to banks; however, regulation could be up-to-date to deal with m-payments. For the UK, banks need to know who is transferring the money, how much and to whom the money is

being transferred to. Yet, there is no regulatory response specifically for any of the m-payments.

6.6.5.4 Technology

Barclays is developing all three mobile payment systems: m-payment, m-banking and m-digital wallet. Their m-banking is an application that is downloaded from the website where the customer can check balances, transfer money between accounts, make payments, view mini-statements. The customer has to have a Barclays account and registered for online banking with a web-enabled mobile. The Barclaycard is their m-digital wallet service where through a partnership with Orange has created a quick tap NFC payment system. "PayTag" pays for goods with one's mobile through a tag attached on the back of a handset.

The aspect that Barclays is excited about is their "Pingit" that is their m-payment. Pingit is an app that is more sophisticated than other banking apps. The customer can send and receive money P2P using mobile phone numbers. The receiver of the money does not have to have an account with Barclays, but the sender does need a Barclays account. The receiver, though, needs to register to be able to receive the cash. It is basically organized as a wallet account, but the only difference from a wallet is that one cannot pay for goods and/or services using Pingit. The vice-president focused more on the marketing aspect when he said:

> *If you have to pay someone else you have to know their bank details, but Pingit will use your mobile phone number as a proxy for sort code or account details, only need to know mobile phone number using the app. Useful when you are with group of friends in paying your other friends instead of diving up debit card. It does not matter what mobile company you are connected with, but you have to have a bank account. So Pingit is a proxy.*

The Pingit app is free and allows users to make and receive payments with just a mobile number. The underlying aspect of the app is a private cloud that works like a cloud-based m-banking service with mobile money platform. Private cloud means that rather than using a website, the cloud sits on top of core IT infrastructure to enable mobile payments, and the apps plug directly into it. Each transaction is

protected by a five-digit passcode. The core capability of the service is that customers do not pay fees for transfers and recipients' funds are immediately available unlike a process that one has to pay in Paypal. Pingit avoids rework via end-to-end processing and remains within the payments flow. This process is very innovative and gives Barclays an advantage over others who presently do not have an equivalent product.

6.6.6 Firm 6: National Payments Corporation of India (NPCI)

6.6.6.1 Supplier

The Reserve Bank of India (RBI) set up an umbrella institution for all retail payment systems in order to consolidate and integrate multiple systems with varying service levels into a nation-wide uniform and standard business process. RBI wanted to facilitate an affordable payment mechanism to benefit users across the country and, mainly, help the financial inclusive of the un-banked and under-banked. Thus, the National Payments Corporation of India (NPCI) was incorporated in 2008 with the aim to operate for the benefit of all the member banks and their customers. It is with the idea that the banks will create a large dimensional infrastructure and operate on high volume in lowering the cost of payment services. NPCI acts as a central hub in all electronic retail payment systems. The objective of the firm is to build a national, central infrastructure and a standard mobile payment ecosystem. There is lot of co-creation and collaboration happening between NPCI and banks, and currently RBI is reviewing the regulatory aspect of allowing telcos to create m-digital wallets with help by NPCI.

6.6.6.2 Demand

With demand comes challenges and the main challenges are two-fold for NPCI; customer enrolment and education. NPCI markets each customer segment (banked, unbanked, underbanked) in their own way because each segment uses m-payment services in a different way. As what the Head-Mobile Payments and Financial Inclusion manager says:

> *…..this country is so huge you know, 298 million customers at this time and there are 600 million people who have got a mobile phone and 29% only having the*

smart phone, the really low end phone and in that situation they want to talk with each other, they want to send their messages and use for much of their payments, they have to have some way out and then in this area has played a wider role in providing a collectivity towards our almost one hundred banks. So that one hundred banks can talk to each other using our introduction for mobile banking and ATM. As of now, what I see that mobile banking is guided by the guidelines issued by the Reserve Bank of India, which is a huge bank in this country and everybody has to follow the guidelines.

NPCI works behind the scene and interacts with the banks. Currently, their customers have always been the banks because NPCI is a government entity, banks are automatically required due to regulation. NPCI was created to specifically focus on efficiency enhancements, uniformity in service delivery and customer experience as well as to extend m-payment systems to potential, rural customers in India.

6.6.6.3 Regulation

NPCI was formulated by the government and is part of RBI's financial policies. Regarding m-banking, the manager states that "[R]egulation has to keep up with the technology and demands, since this is upcoming field." RBI states that only banks that are licensed, has a physical presence and are supervised in India are only permitted to offer m-banking services. Banks must have a system of document-based registration with mandatory physical presence of their customers before commencing any kind of m-banking or m-payment service. Thus, banks are required to use NPCI service since according to RBI this will create a standard ecosystem as well as inter-operability between the service providers and financial institutions.

6.6.6.4 Technology

According to the manager, innovation lies in the "…usage of technology. Service is available; people need to use the same." Hence, this has lead NPCI to create the Interbank Mobile Payment Service (IMPS) to be a disruptive payment solution by making payment processes easier and simpler. IMPS allow real-time remittances through either the business correspondent network or cardless cash withdrawals at ATMs. Additionally, IMPS aims at including telcos through NPCI's USSD platform. This platform would allow telco customers to be able to use m-banking services by simply dialling a common USSD number irrespective of the telco or the bank. This,

in essence, creates a standard process. The Figure 6.2 below shows the transaction process of using the IMPS service.

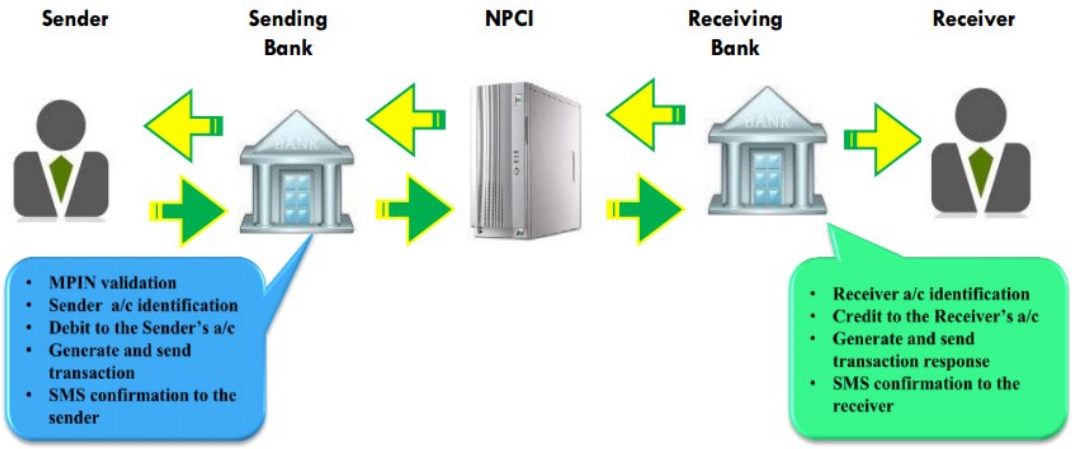

Figure 6.2 IMPS Transaction Process
Source: NPCI (2012)

The following describes how a customer interacts with their mobile phone using the IMPS transaction process. However, keep in mind that when the researcher asked the interviewee how NPCI decides which telco to collaborate with or how telcos interact, the interviewee was dismissive and said that it was "unimportant" because "agnostic to the same." The manager describes IMPS as:

> *[W]hat we have created in this country, a standard micro GM instrument is given to the banking customer. It has got three options, it is a card, it is a pin. A card with a biometric identification which we call the card hand, and the third thing is that, using that in fact. So this card, the biometric card is working, the customer has got a fall back mechanism of using.*

First, the customer registers their mobile number with their respective bank, but the bank has to be registered under NPCI's policy. Second, the bank generates a "mobile money identifier" (MMID) that is seven digits long upon registration. Third, the bank issues a "mobile banking pin" (m-pin) which is a secret password that is used by the customer to authenticate the transaction and give the transaction a layer of security. Fourth, the customer has to either download the m-banking app which can be troublesome for some without access to internet, or the customer uses SMS or USSD to facilitate the transfer payment that is provided by the bank.

At this point, the process can diverge depending on which bank the customer banks with. Hypothetically, ICICI bank will be used to showcase the process from the bank's side. The customer can register with ICICI bank at either an ATM machine or visit a bank branch, but no matter what, the customer has to be registered with the in order use this service. The recipient of the money does not need to register with the customer's bank, but needs to have a bank account under NPCI's registered banks. The customer then downloads ICICI's app via SMS and activates the application by entering the login pin twice. The customer receives two verification messages via text. The app gets opened and the customer has to enter three grid card values given to them by ICICI when they originally registered their information and opened an account. This grid card is needed in order to complete authorization. Sequentially to generate MMID, there are three routes a customer can take: iMobile, USSD or SMS. The customer can go to iMobile on Apple's smartphone and select the bank account and the desired account where the customer's seven digit MMID is displayed. Through USSD, the customer dials *525# where ICICI's m-banking menu is displayed. The customer dials 7 for more services or dials 4 to generate MMID and enter the last four digits of their account number where it is displayed on the mobile. If the customer does not have an iPhone or does not want to use USSD, the customer can send a SMS text to the bank's number in order to generate the seven-digital MMID.

In order to send money, NPCI's iMobile will allow the customer to select the bank account and the desired amount the customer wants to transfer through the iMobile's Insta FT. The receiver's mobile number is entered followed by the MMID number, and finally the actual transfer amount in inputted. Once those details are confirmed, then it is authenticated by entering the required three security numbers from the back of one's ICICI Bank debit card where, finally, money is instantly transferred. An SMS text is sent from the bank informing the customer about the relevant status, but if one does not receive the SMS text, then one must use USSD and dial the number and provide the beneficiary mobile number, MMID, and the amount needed to be transferred separated by spaces. Hypothetically, it would look something similar to this typed out on the mobile phone: 9800123456 (mobile number) 9229134 (MMID

number) 100 (monetary amount), then the customer must enter the four digit pin, and confirm with a reference number provided by the bank. Finally, a SMS confirmation is sent to the mobile phone. Alternatively, USSD can be used when a customer sends an SMS text to the bank's number where a menu becomes visible on the screen and the customer selects the digit 1 in order to transfer money from their account and to the receiver's account by providing the receiver's ten digit mobile number, MMID and the amount to be transferred.

6.6.7 Firm 7: Atom Technologies

6.6.7.1 Supplier

Atom Technologies, an acronym for "**a**ny **t**ransaction **o**n **m**obile,' is one of the largest m-commerce solutions providers in India. Formed in 2006, Atom Technologies centres their services on harnessing the digital transaction for payments with a special focus on the ever-increasing mobile ecosystem. The firm provides end users, or customers, with the flexibility of choosing various payment options.

6.6.7.2 Demand

Atom Technologies' clientele span the government and various industries such as the financial and telecommunication. They focus on the diverse segments of Indian society from large corporations, small businesses to urban and rural individuals/regions. The banks use Atom's aspect of NPCI's IMPS, to operate the transfer of funds in real time as per the requirements of the current day. In addition to working with banks and telcos, their customers are credit card firms who create mobile wallets. The CEO and Director of Financial Technologies indicate that challenges are more to do with customers:

> *For mobile banking the biggest challenge, as of right now, is Indian banking customers to do transactions on the mobile banking application. I think more people have been using it for, more and more, for the two things which people are using it for, one is for basically balance enquiries, and the second is for doing mobile recharges, pre-paid mobile recharges, for the mobile based companies. In terms of mobile payments, yes we have seen a lot happening on the ticketing front but again looking at the land mass of India, the number of people in India, I think the other option is picking up right now.*

Interesting to note that overall Atom says there are more mobile banking transactions than mobile payment transactions in India. Atom Technologies anticipates that this will change in the next couple of years as regulation relaxes to allow telcos into the m-payment ecosystem. However, there are many challenges besides regulation in creating m-payment transactions and Atom indicates that these challenges are more to do with customers.

6.6.7.3 Regulation

From the regulatory aspect, there is no regulation from the application perspective for Atom Technologies. Thus, there are no regulatory bodies or policies in place when focusing on the technology usage of the mobile payment ecosystem. However, there are some affects of regulation as to what the CEO says:

> *It's all mobile banking perspective, regulation does make a difference but from a normal mobile payments perspective, we have our own application and there's no regulation or anything else. From a world banking perspective its, in terms of the limits I don't think, the Indian regulator, have come along in terms of the specific watchdog for technology that we maybe use, its primarily driven by the security channels out there, and watching out for things getting used on other channels.*

The service is regulated to a certain extent. Atom Technologies has to take it into consideration, but overall, regulation does not affect them. Although, Atom Technologies does recognize that for India, the regulation for m-payments is strong in protecting consumers.

6.6.7.4 Technology

Atom Technology's technology creation and innovation really depends on who their customers. For m-payment, the firm collaborates with banks, but for m-digital wallets, they are creating their own service. Innovation to them is driven by the security channel, but it is their technology that makes them unique from other players. They have specifically focused on creating Interactive Voice Response (IVR) that enables payments over the phone where one enters their card details on a keypad of a landline or mobile phone. Additionally, their m-digital wallet solution is a JAVA based mobile application that enables customers to pay for goods and services using a debit/credit card through a mobile phone.

The m-digital wallet is described as the following: for mobile based payments, a customer requires a JAVA MIDP 2.0 enabled phone to install the Atom application. Once the app is downloaded onto the phone, the customer adds 16 credits/ debit / prepaid cards to their phone. All transactions are made using these cards which are authorized by a PIN and encrypted 'end-to-end'. This means that the data is completely protected while it is relayed from the customer to the bank server and back. The customer then uses this system to pay for bills, rail tickets, hotels, etc. The CEO very positively describes what their technology focus is for the next year:

> *[W]e are coming along with one, physically on the application side, we're innovating constantly on the application side in terms of, a) the features b) the terms of using the various kinds of technologies to be used within the application. For example, we have only begun to develop a technology within the application itself. We are, from our side, we are still working on trying to see if they can introduce an FC into India or on the transit side developing. So from this provider we are innovating constantly on the technology side and trying to see what we can do for the rest of the banks.*

Atom's Technology's IMPS, although created by NPCI and described in greater detail in the previous section of Case Firm 6, is used in collaboration with Yes Bank and launched in November 2012. It enables merchants to make interbank payments 24 hours a day through their mobile phones. IMPS allow customers to use their mobile phones as a channel for accessing their bank accounts and enable interbank funds transfers securely with immediate confirmation features. Indeed, the core innovation of this technology is the ability to have immediate confirmation features. IMPS provides an uniform interface for making payments across different payment modes such as the internet, mobile web, mobile app, IVR, USSD and SMS. Atom Technologies simply validates the m-pin and debits the sender account through their CBS interface and sends IMPS the fund transfer request to the bank's internal IMPS switch. IMPS, in turn, prepare the IMPS Fund Transfer Message (ISO 8583) and send it to NPCI who then identifies the receiving bank using the first 4 digit of the receiver's MMID. The bank validates the MMID and the mobile number where then the receiver is credited and a response is sent back to NPCI who routes the information to the sender's bank's IMPS switch. Although there are many steps in

describing this process, Atom Technologies has created an instant money transfer process in connection with IMPS.

6.6.8 Firm 8: Eko Indian Financial Services

6.6.8.1 Supplier

Eko Indian Financial Services was founded in 2007 by four entrepreneurs. They are a financial service company that provides the back-end technology as well as business correspondent network for branchless banking or m-payment services. Eko leverages existing retail shops, telecom connectivity and banking infrastructure to extend branchless banking services throughout rural India. As what the Senior Vice President and Head of Partnerships describe:

> *...here are a number of intermediary banking systems, that are already existing and these are all good things, it's not a critique of what's going on but because there are a certain set of existing systems and processes, the expertise that we have had to build over a period of time, is how you get to talk to some of these intermediary systems, how do you do a transaction?... So what we've done is, you simply file the transaction, straight, to make it very simple.*

Originally, Eko Indian Financial Services were a low capitalized start-up, but they used an innovative business model. According to the senior vice-president, India has anywhere between 15-50 million so-called "mom-and-pop" stores selling salt to shampoo and edible chips to electronic chips / SIM cards. Thus, Eko's business model is that they have enlisted these retailers to become 'Eko outlets' also known as Customer Service Points (CSPs) in their banking correspondent (BC) model. The core services, though, is all about Eko's distribution network. While the accounts are backed by the State Bank of India and ICICI Bank, Eko has created the "tellers" out of the trusted corner grocers who operate throughout India. These grocers are the centre of the unbanked, migrant world.

In order to become an Eko BC, there are certain incentives in place. Each CSPs receives a commission from all the transactions enabled by them as well as accounts opened by CSPs. As Eko has said there is increased footfall into a store more so than a bank, which leads to an increase in the shopkeeper's primary revenue line. There is

what is known as a "Super-CSP" where a much larger retailer is responsible besides being a CSP, but selects and monitors other CSPs in his/her zone. These Super CSPs make more in commissions since they have a more expanded, managerial role in providing Eko services.

Eko signed a business correspondent agreement and commission structure with two banks, SBI and ICICI, in coordinating the opening of basic bank accounts and to provide banking transactions. Commissions from remittance transactions accounts for 70-80% of Eko's revenue. The rest comes from account opening, deposit and withdrawal transactions. It earns a net commission of 10-15% from all transactions and currently loses money on opening accounts. When inquired more about the revenue from these commission contracts, this is what the senior vice president said:

> *Yeah, I think what's important to understand is that transactions, financial transactions, essentially consist of two parts. One is the exchange of information and the other is the exchange of funds. The exchange of information is the cheaper, when you're dealing with physical cash. The exchange of funds is expensive. But if you make both of those electronic, then of course it doesn't matter whether it is mobile or it is not, it really doesn't matter! When you log into your internet banking account and transfer funds it costs nobody anything and that's just the nature of the beast because you aren't moving money, you are just moving a bunch of zero's and one's from one person's account into another person's account. The banking system is not upset because the money doesn't leave the system, it stays in the same state, it just moves from one pocket into the other, in a manner of speaking. So when it's all electronic and you're dealing with just pure electronic stuff, the cost of the transaction can be low but we are dealing with a lot of cash and therefore the exchange of information is really what we've made really cheap; the transactions, the processing of financial transactions are still, and conveniently, and easily, and in areas where say for example data directing is not available, which is a very large part of the country still, that doesn't have connectivity.*

The BC business model brings the unbanked to the banking world by using hundreds of small shop owners. Once a customer registers their mobile number with Eko, a small kirana shop or a pharmacy helps him/her open a bank account at the partnered bank after completing the required formalities. This principal distribution that Eko has achieved is to break the need for new and exclusive physical points of presence since this involves large capital and operational expense. Considered a disruption, equally, it is important to retain and leverage existing over-the-counter transactional

practices, many pioneered by the food moving industry, and adapting them to the financial services industry. The focus is on trust since shopkeepers posses the trust in the community and it is the currency of the broker or financial services provider.

6.6.8.2 Demand

There is a heavy focus on the financial inclusive in India. Eko was founded to specifically focus on the poor, or bottom of the income pyramid (BoP), customers, but BoP customers are not the only ones to use Eko's services. Their target customers and objectives have differentiated themselves from others in the sector since Eko provides no frills savings accounts to the unbanked and underbanked masses by straddling the formal and informal channel.

The company needs scale to survive and India is a huge country with deplorable infrastructure, yet the consumer focus is to reach the most fragmented, transient and most difficult to market to. Thus, Eko spends incredible amount of their money in marketing, specifically offline marketing. Eko has yet to earn a profit because it is neither sustainable nor sufficient that customers just open new accounts. Customers have to be active in using the various banking services. The senior vice-president has said that prominent businesses are using Eko's patented technology for money transfer. B2B represents 10% of the overall transaction volume, and 30% represents transaction value. Thus, Eko is focusing on creating a stronger presence in the B2B space.

6.6.3.3 Regulation

In 2006, RBI first issued regulations concerning BCs by creating the credible financial inclusion policy in order to extend banking services to BoP customers. By 2008, more policies were issued where guidelines stipulated that any bank's BCs must be within a distance of 15 km from the bank branch in semi-urban and rural areas as well as 5 km from metros. This was a concern for Eko since it had expanded to rural areas or villages that did not have a bank branch within 15 km. It also posed a regulatory risk and basically left them with needing to reformulate their business model.

BCs are very similar to a bank's agent where the agents' focus is to acquire new customers and provide them with no-frills savings accounts, enable deposits, withdrawals and remittances for them while earning a commission. Initially, the RBI guidelines only allowed not-for-profit organizations to be appointed as BCs where as such Eko Indian Financial Services created a separate entity named Eko Aspire Foundation. The Eko Aspire Foundation is to serve as the BC partner Eko India Financial Services and provides back-end service enablement.

6.6.8.4 Technology

Eko's technology uses back-end servers that are integrated with the core banking system of State Bank of India. The mobile phones of customers and retailers act as debit cards and PoS devices. Customers walk-in to retail stores to open a savings account, securely deposit and withdraw from the account. With the mobile phone, the retailer acts as PoS device. Performing a transaction only requires numeric literacy for number dialling since there are no app, no special SIM card, no SMS. The key aspect is that the service works across all phones. In addition, Eko provides non-financial services such as mobile recharge. The senior vice-president describes the service process:

> *So you need to know who the person that needs to be debited, you need to know who the person that needs to be credited, you need to know what the amount of money is for which this transaction needs to happen and you need the person who's being debited to authorise the transaction. This is all that happens for any financial transaction, it doesn't matter what the ticket size is or who it is happening between, there's (a) party and (b) party, (a) party gets debited and (b) party gets debited, (a) party has to authorise…So there are two pieces of information, so like I said there's an information exchange which says who's the person who has to be debited, who's the person who needs to be credited and what's the amount of money that needs to be. And the last piece of information is, is there connection within the time, has it been authorised by the person who's asking for the debit. Once all of this is done, the accounting follows but what the bank then proceeds to do is to debit your account and credit mine. That's the accounting leg. That is the fund transfer leg… In the bank, money transfers may need to end up getting routed, banks sit on certain amounts of cash that they need to settle, so there are settlement systems that you need to deal with.*

There are some issues surrounding trust and in order to bridge trust with customers, Eko tries to get agents to pre-fund wallets. The agent who Eko appoints puts that money into the bank, in lieu of what they are able to accept in deposits. The agent puts in a thousand rupees and the customer will come in and want to deposit 100 rupees into their bank account. The agent will receive the cash and debit their pre-funded wallet account to credit the customer's bank account. This, essentially, de-risks the customer, and the agent gets a message instantly saying the money has been deposited. It also de-risks the bank because as opposed to receiving cash from a customer and then going and depositing it into the bank, the agent has actually put money up front and the agent is simply collecting the money back instead of getting it back from the bank. The agent is getting it from a customer of the bank or what is known as a refunded cash management model. This is great for deposits, however, when it comes to withdrawals of course, the agent often needs to have cash in their till, so when a customer wants to go and do a withdrawal, what the agent needs to do is debit his account and debit the customer's account as well where then the agent credits the retailers.

The authentication mechanism, OkeKey, was developed by Eko. The agents use USSD to dial from their phone the transaction information such as the mobile number of the receiver and amount to be transferred. This information is relayed over the communications network to Eko's servers. Eko links the mobile number of the receiver with an alias of the persons account number very similar to writing a check. In order to secure the transactions, Eko agents and customers use a patent-filed, low-cost paper based security mechanism of generating a unique one-time password for each transaction known as OkeKey. OkeKey is basically a digital signature in that it allows one to generate a one-time password on a RSA device. A RSA device is a small bundle like a USB stick with a little display screen. This device is a password generator and creates a six or seven digit number every sixty seconds. Eko validates transactions and completes the banking and accounting leg. It also sends instant confirmations to the agent as well as the sender for each transaction via SMS.

6.6.9 Firm 9: Mahindra Comviva

6.6.9.1 Supplier

Founded in 2004, Mahindra Comviva, formerly Bharti Telesoft, globally provides integrated value-added services (VAS) solutions and technologies for telcos. They are mainly focused in trying to create a stronger VAS ecosystem.

6.6.9.2 Demand

Mahindra Comviva's customers are mainly the telcos or other mobile payment service providers. Six years ago the firm created an m-banking app for ICICI Bank, but realized that the obstacle was the applications were not synonymous with what customers wanted. Thus, customers did not use the additional options they had, especially with mobiles. Therefore, Mahindra Comviva recognised that customers are resistance to change and discovered that security was more of a concern. As what the vice-president says:

> *You know people have got phones out there but at the same time we've covered some seven hundred types of mobile, and even if it's a feature phone. It is a challenge but everything is kind of working fine and then we realised that the consumer had options and it did not kick off, because there's two reasons. One, obviously the resistance to change but at the same time we realised that consumers were kind of believing that, or there was a feeling that security was a huge issue for the mobile phone. So kind of we had the best of the products and the latest security and mechanisms and everything packaged, the consumer option did not take place and if we really kind of attack or understand what the consumer needs, we did not. And at the same time, does the consumer understand the idea, you look at that. These are some things which are very important and finding the processes, how do I enable the process to make it simple that the consumer can kind of really adopt.*

Thus, the firm started to focus on the consumer needs, especially when dealing with illiterate consumers. They focused on channels for specific consumer segment and what would be the easiest way for a consumer to complete a transaction. Specifically, they focused on the unbanked and how to create an intuitive in order to enable idea on idea.

6.6.9.3 Regulation

In regards of regulation, India has never prescribed or forced banks to necessarily collaborate with telcos. Since Mahindra Comviva focuses on many aspects of the m-

payment ecosystem, they have to follow a number of phases relating to regulations. The vice-president talks about three frameworks of multiple regulatory guidelines. These guidelines include the guidelines as set out from the Bank of India and the Government of India, the Mobile Banking Guidelines, and the prepaid instrument criteria policy.

6.6.9.4 Technology

Mahindra Comviva supplies products and technology for other firms in the m-payment ecosystem. The firm has created PreTUPS which is a prepaid recharge platform. It facilitates the prepaid recharge distribution and enables consumers to either, directly, top-up their prepaid account through various channels such as the web, ATMs, USSD. Additionally, their Mobiquity technology accelerates the shift from a cash and carry to a cashless lifestyle. The platform gives customers the flexibility to aggregate multiple payment instruments onto their m-digital wallet account to initiate remote transaction or make proximity payments using NFC or QR codes. The mobile phone becomes a digital container for holding money and payment instruments. This enables service providers across financial, telco and retail industry to cater to the diverse financial needs to the various consumer segments. The platform delivers a range of financial and payment services such as mobile money, branchless banking, m-banking, m-payments and PoS solutions through various handset bearers including client app, QR codes, NFC, USSD and STK. Overall, the firm's innovation focuses on innovative solutions for data and fraud management.

When asked about if these technologies are making m-payment systems cost effective, the vice-president suspects that "after a while cost would not be such a big thing, a big issue for somebody to launch their services. For sure anything which is self-service or big electronic side or distance side in all of this, more cost effective." He adds that mobile transcends the cost, but it really comes down to what errors the firm can overcome to become profitable.

6.6.10 Firm 10: Induslnd Bank

6.6.10.1 Supplier

Induslnd Bank is a private bank in India founded in 1994. The bank's name derives from the Indus Valley. The bank mainly focuses on collaborations in order to provide microfinance solutions and extend savings based solutions. They have a so-called "customer first" attitude and believe that this is core to their success. They are continuing their initiative of "Responsive Innovation" that is part of their three unique propositions called cash-on-mobile, direct connect and quick redeem service.

6.6.10.2 Demand

In order to focus on high volume, low transactions, the bank tries to find intermediaries who already have the capabilities and expertise who can reach out to the, specifically, the unbanked. Thus, the bank has collaborations with telcos and BCs such as Eko Indian Financial Services in order to use their knowledge of expertise. The Chief Manager offers his opinion on why the bank focuses the unbanked and underbanked:

> *…80/70% of India's population living in the rural side of the country. Two things which may count, for one taking mobiles for banking in this particular sector is, one is number literate. The poor segment, the rural segment in India are not much used to reading in English numbers but particularly they are illiterate and they don't even understand the numbers while reading, they can pronounce, they can understand but they may not be able to read it. That is number one because of mobile banking usage requires the, the requirement of transactional security, some sort of sort of pin or thing or digital password, which has to be memorised by the customer, but for me in India it's quite easy, but for those sitting in a village who has a minimum literacy level, this may not be possible. That is number one. Number two; there is a challenge of connectivity in the rural areas even now. Now a few things happening in bits and pieces currently, not in quite synchronisation, for example taking mobile banking to the masses, to the one hundred million population of this country, requires a handset….*

Eko sees the demand out in the rural areas of India, but they have to cater towards the customers, especially customers who have connectivity issues. There are other kinds of firms who have entered into the system in providing services to rural customers, but Eko believes that they have the right business model to handle the time consuming process of increasing mobile penetration throughout Indian villages.

6.6.10.3 Regulation

RBI is the central regulator and have been directing and mandating Indian banks have to focus a certain percentage of their customers on the unbanked and underbanked segment. In general, this presents a challenge and a dilemma for the banks because these potential customers are not accustomed to any kind of banking habit. In addition, the nature of potential customers' expectations and the nature of the product requirements are very different from traditional bank offerings such as a savings account. Regulation is a hindrance to a certain extent; regulation creates innovation.

6.6.10.4 Technology

The firm has created IndusMobile that allows customers to bank anytime anywhere through their mobile phone. Customers can access information and transact at absolutely no cost charged by the Bank and at high level of safety. Customers are also able to book movie tickets, pay their bills and perform mobile to mobile funds transfer through using NPCI's IMPS. Induslnd Bank has become one of the first banks to allow its customers to initiate cardless cash withdrawal transactions through apps. One can download the app or install and use the SMS after registering. All transactions are authorized using a 4 digit m-pin ensuring a two layer security.

The process for using IndusMobile is that the customer has to first register with the service provider, in this case the bank. Once the customer has visited a branch or an agent of the bank, then the bank checks the identity and address. Additionally, the customer can register by sending an SMS to the bank's customer care department, but there is a presumption that customer is already an Induslnd customer. Verifying the identity and address is harder in India because of lack of national identity cards. Thus, this causes set-backs in registering potential customers.

The customer can withdraw money from the outlets, but one has to enter the agent code, the PIN and the amount. The customer receives an SMS with a transaction ID. If the withdrawn amount is more than a regulatory limit, the bank will send a one-time password to the customer's mobile. Money is transferred from the account to the BCs account. The BC verifies the details where they then give the cash to the

customer. The customer can also transfer money to anybody regardless if they do not have a bank account; similar process to Barclay's Pingit process. All the customer needs is the recipient's phone number along with the transaction amount. The bank sends a message to the sender and the receiver along with different pins. The sender has to message their PIN to the receiver who then uses both PINs and their mobile number to withdraw cash from the bank's ATM. The money has to be withdrawn within 24 hours after which the transfer will be cancelled. If the receiver does not withdraw the full amount, the balance will be debited to the sender's bank account. The service is free, but operator charges do apply.

When asked the chief manager about if this process is cost effective, he offered a very resounding yes as well as how the challenges to obtain a level of cost effectiveness:

> *Mobile banking is cost effective but currently mobile banking is facing its own kind of challenges in Indian terms. Since the bank and this particular concept has taken up in India, still now, primarily the usage of mobile banking has been in getting mobile alerts. Most people use these for SMS text driven purposes, rather than the GP guide and enabled services which is actually the main requirement for driving transactions, financial, hard core financial transactions…*

Eko believes that m-payments are cost effective; however, it requires a huge amount of upfront capital investment. Specifically, the technology is expensive in both the front end and back end of the service chain. Yet, mobile technology is hardly 10% of the entire cost involved in the smart card platform. Costs involved include the technology platform which deals with the connectivity level; and the password booklet from Eko. This makes consumers vulnerable and Eko is working on innovative ways to protect the customer through technological innovations.

6.6.11 Firm 11: Idea Cellular

6.6.11.1 Supplier

Incorporated in 1995, Idea Cellular is currently the third largest cellular company in India. It has a strong brand name with potential growth in the data centric services, but it comes with intense competition. The firm is part of the Aditya Birla Group and has partnered with Axis Bank to create an m-payment system. Through this

collaboration, Idea Cellular provides the technology platform, and is also a business correspondent with retail customer service points.

6.6.11.2 Demand

Customers are on a subscriber base where Idea Cellular offers flexible tariff plans that helps creates their m-digital wallet. Knowledge from their data centric resources has given the firm the capability to reach the remote areas of India. Indeed, the collaboration with Axis Bank has developed one of India's first mobile based financial inclusion initiatives. This initiative is bringing an innovative, banking idea to the unreachable areas of rural India. Additionally, it is contributing to the financial inclusion of mainly the unbanked population through mobile apps in order to provide a better life.

6.6.11.3 Regulation

Since they are a telco, Idea Cellular has to comply with both the financial regulation as well as the telecommunication regulation. Idea Cellular does not necessarily focus on the transfer aspect of the payments, and thus, can avoid certain financial regulations. However, because it focuses on the technology and response time of the transfer, they have to comply with the telecommunication regulation. Additionally, accurate records of all transactions using the mobile phone have to be maintained. TRAI, the telecommunication regulation, has no input from a regulatory perspective of the service because it is a payment instrument which is the exclusive domain of the financial regulation, RBI. However, the m-digital wallet is a semi-closed loop wallet, and thus, it is categorized as a prepaid instrument. The Deputy General Manager and Head of mBanking/mPayments at Idea Celluar made a point to emphasize that "[R]ight now telco's have to go to banks, because it is still controlled by the Financial Services Regulator" when discussing if telcos need to partner with banks even when creating m-digital wallets.

6.6.11.4 Technology

Idea Cellular, in collaboration with Axis Bank, launched "Idea MyCash." This service is basically a financial inclusion platform that offers banking facilities. The

process is that Idea Cellular's retail outlets act as CSPs, thus these agents are BCs to Axis Bank. IdeaMyCash has a BC that facilitates the opening of bank accounts where customers can send and receive money. Since it is a semi-closed loop wallet, in essence, the wallet allows users to exchange physical cash for virtual money that can be stored on the phone in order to make purchases.

When discussing if m-payments offer any kind of revenue, this is what the manager had to say:

> *From a cost minimisation point of view, if it is compared to doing the transaction at the bank or in any other channels, then mobile is definitely not the cheapest, from the technology point of view. So I don't know how the banks of Europe, banks of other countries are looking at it, as a more costlier option to than gaining a breakthrough to see any revenues from the investments that they have made, in mobile telecommunications.*

Semi-closed wallet is an innovative product being used in India. It simply enables mobile owners to transact with merchants through their mobile phones, but, more importantly to note, Idea Cellular does not require the customers to have a credit card or a bank account. Customers can conduct various menu based transactions from booking tickets to paying utility bills. A customer can make purchases at designated merchants by entering the merchant's mobile number, the amount and a m-pin. The actual transaction loop is closed by a settlement between the merchant and the telco who issues the SIM card.

6.6.12 Firm 12: iKaaz

6.6.12.1 Supplier

Derived from the Tamil word of Kaas which translates into English as money, iKaaz is a technology firm that has developed an m-payment platform. They are a global provider of secure m-payment solutions. The firm collaborates with other technology firms, BCs and merchants in providing cashless transactions. iKaaz was founded by former Nokia Money employees who saw NFC technology as the next step towards a stable m-payment platform. These former Nokia employees have brought a lot of knowledge and expertise in the space of m-payments as well as mobile consumer services. Currently, the iKaaz is focusing on the B2B segment of the market and

strengthening their presence beyond India. As what the CEO says "their technology solution is to build in emerging economies to address a problem in emerging economies."

6.6.12.2 Demand

The firm caters to consumers and merchants. They provide m-digital wallet for the consumers and mobile PoS for the merchants. Their m-digital wallet though is for the B2B segment since iKaaz is one of the first firms to create a digital wallet for merchants. Although iKaaz offers global services, for India, the CEO says "[B]ased on the macro level trends, it is safe to say that consumer adoption is yet to take off within India and even globally we are just seeing a little more traction amongst consumers than in the past." Thus, iKaaz is open to collaboration because they see that marketing is a core requirement for any firm to succeed in the m-payment space.

6.6.12.3 Regulation

Since the firm is a technology provider, the regulatory body is not financial nor is it telecommunications related. With a focus on m-digital wallets, though, the firm has to follow the regulatory body of RBI. RBI does not allow for cash withdrawals from m-digital wallets. iKaaz's wallet is considered a semi-closed because customers cannot withdraw money once money is deposited. In a semi-closed mobile wallet or prepaid instrument, one can load money onto the mobile phone from a licensed firm and make payments, but it cannot be used to withdraw money.

6.6.12.4 Technology

The firm has launched a NFC reader which converts a mobile phone into a mobile PoS device, or as what the CEO of iKaaz calls the "master suite of mobile payments solution…in offering a low cost NFC based solution." The reader plugs into any mobile phone and is able to accept cashless payments from customers who use iKaaz NFC stickers that are attached to their phones. This is what iKaaz calls a "tap and pay" service solution that can be used to pay for retail, transportation, entertainment and other payment points. With the use of NFC terminals and phones, the firm has created a cost barrier for merchants, and thus, an m-payment system combined with

m-digital wallet. Customers are freed from long queues while merchants are able to significantly reduce transaction costs. When discussing revenue aspects, the CEO has said that future is with NFC technologies:

> *Consumer End profit margins are very minimal in feature phone, low end phones, so only smart phones are NFC enabled in India. With less than a fraction of the 5% of our smartphones users having NFC, it would have been a slow uptake in India. To address this situation, we have arrived at a NFC tag/sticker at the price of as low as US$2 which equates to about 100 INR. Consumers can associate their NFC tags with a prepaid account or a bank account. As these NFC tags will be available at such low cost for end customers, it will change the mobile payments game. Adoption should explode. Merchant end, India has more than 25 million retail merchants. We can't expect everyone to buy an expensive NFC POSs or smart phone. Investment cost involved on setting up a POS with NFC capability is high. To overcome this, we are going to launch a low cost NFC reader. This reader is going to be huge game changers for mobile payments.*

For India, NFC technology has been slow to take off because of the high cost of NFC terminals and NFC-enabled phones. Although iKaaz has somehow innovatively bypassed the NFC barrier, it is unclear in the service process who bares the cost for the NFC stickers since it can be shared between the consumer and the merchant. Although the business model is peer-to-peer, or B2B, this assumes an expectation in that merchants need to accept the cost of the stickers and readers. If this is the case, then the merchants would therefore have to distribute the stickers to every customer or whoever wants to make a payment using iKaaz technology.

6.6.13 Firm 13: Beam

6.6.13.1 Supplier

Beam is the brand name of Suvidha Starnet Private Limited which was established in 2002. Originally, the firm's focus was on a being a cash transaction facilitator in India, but they have strong capabilities in consumer products, telecommunications and retail background where money is treated as a consumer product. The firm works with the end-users, but also collaborates with merchants. The company competes with a number of telcos and private technology players in the m-payment ecosystem. As the Chairman has explained, the idea of Beam was influenced by his driver who had been trying to transfer money to his mother for medical treatment via money

order. There was a delay in the money transfer and the money did not arrive in time. This led to the inspiration for Beam in developing a quicker transaction service.

6.6.13.2 Demand

According to the Chairman of Beam "customers rarely buy technology rather buy products that fulfil their needs and bring convenience." Originally, the firm started to work with banks as a service provider for cash management, but Beam invited educated, unemployed youth to become "Beam sahayak." These sahayaks are mainly females, and can be considered BCs based on what they do in the service chain. Beam focuses on small locations and villages through promotions and live demonstrations. For the future, Beam is more focused on increasing their customer base and their distribution network. As the chairman explains:

> *The payment systems in India are inefficient. Over the last 75 years banks have only been able to reach 30,000 of 600,000 villages. Thus, there are over 720 million un-banked persons or about 60% of Indians who cannot benefit from the nation's economic growth and global commerce participation. On the other hand explosive growth of mobile telecom has connected over 800 million Indians – even living in the remotest villages. Enabling people to transact using mobile presents an unprecedented large opportunity with a market potential in excess of US $600 billion. This is a huge market for all of us to tap. So the opportunity is there, the trick is to exploit it.*

The top three challenges that Beam has had to deal with has been distribution, building trust with consumers and training people whether it be partners or customers. The merchant does not provide the service if they are not paid and the customer does not deposit money unless they receive the service. Another challenge is India has many vernacular languages so it becomes time consuming in educating customers and the channel partners in the language they know and in a manner that is simple to understand.

6.6.13.3 Regulation

It took time for RBI to approve Beam's services, but by end of 2009, Beam Money became an authorized payment system. In India regulatory hurdles are extremely high and onerous. RBI authorized Beam Money to operate m-payment systems in rural areas of India with a focus on inclusive banking services for the unbanked. The

firm is classified as a 'Payment Gate' by RBI. This simply means that Beam Money acts as an escrow account with a bank and thus, avoids an actual partnership or collaboration with a bank. Beam has found many hurdles in dealing with regulation in India. One of the concerns is the time it takes for approvals. Therefore, Beam has seen an increase in collaborations, especially with the BCs in order to get a license. For India, very strong regulation and Beam has found that there are no short cuts in getting around these regulations.

6.6.13.4 Technology

Eventually, Beam moved away from cash management aspects and created a cashless payment system for various kinds of services. The Chairman describes it "[Y]ou don't even need an app or internet if you don't have, just SMS or IVR to use our services." Beam Money is essentially an m-digital wallet that enables users to pay for goods and services and transfer money over their mobile. The payment system is free to register through a simple SMS text where then the account is automatically established.

The innovative aspect of Beam Money is that it works on any wireless network. Previously, this has been a barrier to widespread adoption of cashless mobile money because historically this service has been limited to one network. It is an aspect of what is known as an agnostic mobile money service. In order to ensure security, each user has a unique 16 digit transaction identification number. Additionally, every transaction has a different number so data interception becomes ineffective.

6.7 Conclusion

This chapter was the second of two empirical chapters. The chapter elaborated in more detail in terms of the service innovation and the innovation processes of the case-firms. Data was organized through thematic analysis of the case studies identified key features of innovative services and innovative processes as well as the effects this has on the ecosystem in both countries and the firms. For organizational aspects, the case-firms followed a divisional structure of supplier, demand, regulation and technology. This structure simply made it easier to offer in-case analysis besides

country comparison. The next chapter, Chapter Seven, offers a detailed analysis of the two empirical chapters. The chapter also offers the specifics of answering the research questions while providing linkages from the literature.

Chapter Seven: Data Discussion and Analysis

7.1 Introduction

The previous chapters, Chapter Five and Chapter Six, presented the empirical data of the research. This chapter presents the discussion of the data and analysis. The chapter answers the main research questions concerning SSI and business models; and service innovation. The research focuses on understanding the existing phenomenon of m-payment systems' innovation in a developed country, the UK, compared to a developing country, India. It has been said within innovation systems that developing countries are usually inundated with the proliferation of low-level technologies that are conducive to low-technology industries. However, this research has shown that this is not happening in India in regards to m-payments. Srholec (2008) has said that innovations in developing countries are largely incremental, gradual and context-specific improvements based on previous technologies that originate from developed countries. India m-payment systems are incremental innovations, yet they are not necessarily from previous technologies.

This chapter is divided into four main sections. The first section focuses on answering the first research question. It presents sub-sections concerning SSI in both countries and how ideas space can be applied to M-Finance SSI. It also analyses the business models that are taking place in both countries and presents a discussion on new type of business model, the Business Correspondent model, from India. The second section presents answers to the second research question concerning service innovation. It divides the section into sub-sections and discusses the themes individually as well as discusses aspects of cross-case analysis. The third section discusses the nature of innovation between the UK and Indian M-Payment Sector. Finally, the fourth section focuses on presenting the key differences of researching this specific service in two economically diverse countries. It does not focus on country differences, but instead explores the key differences concerning sectoral and innovation processes as well as hurdles for m-payment systems.

7.2 Answer to Research Question 1: Sectoral Systems of Innovation

The first research question is: *how does a diverse sectoral system of innovation shape business models within the mobile payment systems?* This question is rooted in system of innovation literature where the dynamics of systems evolve and change. Innovation and technological system literature has stressed that in the innovation process the interaction among actors, the role of non-firms organization and institutions differ across sectors and technologies. Only a few of these contributions have expressly focused their attention on sectors and sectoral differences. Most have made claims on sectors within broader conceptual and empirical analyses directed to very general issues such as differences in processes of economic dynamics and evolution, or the role of interaction in the innovation process. Interesting how in previous research, even if sectors differ from each other, then knowledge and technological opportunities differ as well (Freemen and Soete, 1997; Rosenberg, 1982).

The focus of the research uses SSI because given the limitation of the NSI approach, the advantages of the SSI approach is better in order to define the main factors and elements that influence the firms' innovation process as well as the firms' paths for innovation. Thus, this approach provides the possibility of having an integrated and consistent analysis of the sector. It also gives the possibility of fully understanding its working and transformation with respect to several dimensions, such as type and role of actors, the structure and dynamics of production and the knowledge that underpins the sector. Also, SSI understands the effects of these dimensions on the firms' innovation performance and the rate and direction of innovation.

It has been argued that by simply considering the complexity of SSI, then meaningful interventions and learning in sectoral settings can be conceived of and propose part of the business model besides the innovation process. SSI advances the understanding on the heterogeneities among firms within a sector and the change in the relationships among the actors. Also, it looks at the patterns and regularities in regards of structure and dynamics using empirical data where public proposal can provide insight into how to better affect the transformation of sectoral systems and innovation. Yet, SSI is not a prescriptive theory; the different elements of the general

framework have shown its importance in practice. In a broad sense, any kind of innovation system will encompass knowledge, learning and competence building while taking into account social institutions in their interactive process.

Literature on innovation systems have mainly been carried out in developed countries where the approach has been increasingly used to discuss aspects of technological catching-up and transition economies (Cassiolato et al, 2003; Kim, 2000; von Tunzelmann, 2004). When one looks into a system, there has to be a holistic view of all relevant sectoral actors because it would not be feasible to understand the trajectory of one actor without understanding that of others. However, since SSI does not include national differences in its building blocks, it cannot explain such things as how and/or why certain pioneering firms within a particular industry usually come from certain countries. The main argument is that organization and production process developments that characterize leading firms simply cannot be replicated in the newly industrialized countries. Yet, the examination of SSI in developing countries is increasingly tangled with the understanding of the Penrosian evolutionary growth of firms; learning is placed at the foundational level as the key component in the so-called catching-up phase (Amsden, 2001; Hobday, 1995; Lall, 1997). In addition, these researchers emphasize that the innovation system approach for developing countries requires some adaptations as compared to developed countries. Thus, analysis should pay special attention in how globalization processes affect the possibilities to build systems of innovation and regional systems as well as potential conflicts between interests of the different actors in the innovation process need to be acknowledged (Lundvall et al, 2002).

Indian innovation is much more closed and less international than the UK. At first sight, this seems perverse given India's international success at back-office data manipulation, for example Infosys, Tata, Reliance, and the direct involvement of these firms with telcos. Regulatory constraints such as 2G expansion, bank restrictions, ownership restrictions, explain absence of international involvement in the Indian m-finance SSI, noting that firms such as TIBCO are also back-office service providers. In the UK, both the banks and the telcos are internationalised,

making the SSI more open to new ideas, however, lack of system-wide standardisation whilst allowing a thousand flowers to bloom, means that product innovations abound though processes inhibit interoperability (Abernethy and Utterback, 1978). The Indian institutions oblige banks and telcos to work with intermediaries creating system-wide standards to support innovative services; in this sense the Indian m-finance SSI is more innovative, especially from the viewpoint of the unbanked. The UK SSI meanwhile, with exceptions such as Barclays, is focusing upon cost-down innovations such as NFC and m-digital wallets, neither of which are radically new products.

7.2.1 M-Payment SSI

The last two decades has seen the introduction of cards (debit/credit) that has given customers the opportunity to make purchases via different shopping channels (Taylor, 2006). In addition to these introductions, it has also increased the usage of security and privacy issues, but, more importantly, it has led to the development of e-commerce. This has boosted the usage of methods of payment as customers search, select and pay for products and/or services at their convenience besides saving a significant amount of time (Balasubramanian et al, 2002). This shows evidence that the potential for existing payment methods and future payment methods to be adopted exists as long as customers, retailers and intermediaries (merchants) are involved in within the sector.

Developing countries are jumping ahead of developed ones by building a 21st century infrastructure because they have little legacy infrastructure to begin with. For example, India has advanced from no land-line telephones to the latest in wireless telephony. This revolution, in turn, is causing India to leap from brick-and-mortar banking to wireless banking for the masses (Prahalad and Hammond, 2002). Similar patterns are seen in other developing countries as well. Therefore, counterintuitive as it may seem, developing countries may be ahead of developed countries in m-payments.

7.2.2 Sectoral Systems of Innovation: UK

To a certain extent, the m-payment environment in the UK is intricate and crowded compared to India. Indeed, the abundance of financial institutions and other financial intermediaries in the UK creates a complex landscape with respect to the convergence of diverse, independent industries within the m-payment sector. Furthermore, regulatory ambiguities, security and privacy concerns, together with lack of unified standards are significantly hampering engagement in m-payments services.

For the UK, one factor which is impeding the ubiquitous proliferation of m-payments is the lack of collaboration and cooperation between diverse sectors within m-finance SSI, including financial service firms, telecommunication providers and other merchants. Although, cooperation is getting better, when regulation does not force it, these firms are very individualistic in the sector. Banks, telcos and merchants are more cooperative in India because the regulation forces it as times, which seems to be leading to greater success in terms of m-payment proliferation. It is likely that competitive pressures, uncertainties regarding successful engagement within SSI and a lack of trust are principal to the phenomenon in the UK market context.

7.2.3 Sectoral Systems of Innovation: India

India's m-finance SSI strives to include the poor and unbanked because the social justice agenda is important. Expansion constrains include the difficulties of marketing m-payment services to often illiterate, rural residents and the absence of 2G network connectivity in many rural areas. The institutional and regulatory environment in India promotes the social justice goal of enabling BoP consumers to become 'banked' via m-finance and m-payment. Regulations and institutional arrangements in India are supporting and driving m-finance innovation, thus, firms are responding with appropriate technology. However, as elsewhere in Indian economic development, infrastructure is a major constraint.

SSI governances in India's m-payments are heavily influenced by the state, in particular the financial inclusion agenda. These arrangements have led to the creation of sustainable business models serving the unbanked. However, this is at the cost of

limiting innovation in the wider system by inhibiting entrants and slowing down the rollout of 3G. In context, Indian m-payment systems are highly innovative: leveraging other social institutions, enrolling 200 million unbanked users and services such as P2P financial transfers. The latter in particular is a key know-your-customer (KYC) demand currently met in India, but not in the UK. Provided transaction volumes continue to rise, India's m-finance SSI has created sustainable business models. The challenge is to alter the model as more people join the middle-classes and demand more sophisticated services noting that middle-class users yearning for 3G enabled services in cities are paying the price for the institutional pressure on the banks and telcos to priorities unbanked users.

Data reveals that the Indian government, through their regulatory policies, dictates the business models in who takes the lead in alliances and collaborations; primarily favours banks. Yet, data disclosed that there is no firm leader within these collaborations, but more-or-less equal partners (peer-to-peer; collaborations). However, banks tend to see themselves as the leader of the services. Therefore, telcos have to carefully navigate their strategy when it comes to their lack of knowledge in financial services. Already, there is tension building between these two particular sectors.

India has a large unbanked population because of the challenge of reach and affordability. However, with 840+ million mobile subscribers, m-banking can provide a fast, inexpensive, easy, convenient and secure channel for customers to carry out banking transactions. While the m-banking application of banks offers a set of services to its customers, there is a need for connecting major banks together and in offering an instant 24/7 remittance solution to customers. NPCI's Inter-Bank Mobile Payment Service (IMPS) — an innovative payment mechanism — addresses this need.

NPCI has one major asset: The 60+ large banks in India connected to its ATM Network. It leveraged this infrastructure to cost-effectively offer an instant 24/7 payment service by using mobile as the channel. NPCI worked with banks and co-

created this product in a very short time. It defined standards for message exchange using the same ATM connectivity infrastructure and provided a routing and settlement mechanism for transactions where transactions are instant and immediate. Now that the banks are connected, many value-added services can also be offered through the same mechanism. NPCI plans to connect various approved non-bank entities offering prepaid solutions on this platform to provide wider access. NPCI itself is promoted by 10 leading banks in India. While these banks fiercely compete in the market, they also collaborate to achieve national objectives.

7.2.4 Ideas Space

As a reminder in what was discussed previously in Chapter Two, the literature review, ideas space is what Ogle (2008) refers to as a paradigm where ideas include boundary hopping ideas that allow for re-combinations of knowledge between paradigms. Thus, it is a community of practice and in applying this thought process to a sector that uses technology heavily reveal innovation rather than obscure or hinder innovation. In applying the concept of ideas space to SSI in the two countries, the data has shown that, if anything, innovation is happening. It comes down to who is creating this innovation and how is this innovation being created.

The components of each of the SSI frameworks shown in Table 7.1 and Table 7.2 relates back to Table 2.1 and Figure 2.3. As a reminder from Chapter Two, Table 2.1 focuses in on the 15 key variables. These variables includes: 1) the solution; 2) institutional thickness or institutional voids; 3) complementary arrangements; 4) customers and strategy; 5) connectivity, interactivity and opportunity; 6) scale and scope of services; 7) key governances and standards; 8) price; 9) cost; 10) viability of business model; 11) possible disruption of business model or firm; 12) changes in market, technology, regulation as opportunities or threats; 13) firm's strategy exploitation or exploration; 14) firm activity learning, exploiting R&D or evolving dynamic capabilities; 15) sustained innovation create sustainable business model. The last five variables focus in on how through ideas space, changes in the firm, the market, the business model and strategy is owed to a number of possibilities.

Table 7.1 focuses in on the 15 variables and applies to the UK M-Payment SSI. For instance, variable two, the UK has institutional thickness as compared to institutional voids. Variable twelve, low cost cloud services may disrupt services in the UK; however, changes in the regulatory framework will disrupt the services more so. Variable 13, banks and telcos in the UK are exploiting their existing customer base through innovative ranges; specifically seen with Barclays where innovation is creating a competitive advantage. Variable 14, R&D is driving down costs where both telcos and banks are creating bundle products and services. Variable 15, despite the recent banking crises, the firms within the UK SSI will eventually be profitable and be able to become global service providers.

The UK m-finance SSI is intensely competitive, since entry costs are low; this is especially so in cloud-enabled m-digital wallets where discounting deals flourish. However, the most important aspect of cloud based wallet is that it overcomes the adoption hurdles for NFC-based payments; a hardware problem. Cloud-based wallets are software-based technologies like the QR codes and line-skipping apps, which delivers a better value proposition for the service. Line-skipping apps are applications that allow a user to eliminate checkout lines, which improves response times as well as customer experiences. Registering participants is less of an issue that encouraging usage.

Governances in the UK m-finance SSI have altered dramatically as new entrants challenge the monopoly position of the banks and telcos. There is now a multiplicity of standards and business models, which whilst favouring innovation, makes system-wide interoperability difficult. Barclays P2P transfers heralds a breakthrough in the sense of meeting a KYC aspiration of paying for anything or transferring money to anywhere with the ease of sending an email or authorising a NFC pin. Previous telco business models deteriorated such as the voice ARPU, text-charging. Now UK telcos rely on smart-phone data transfer by the 87 million contract holders which is 94% of the UK population, though this compensates in part for a 3% pa decline in fixed-line contracts. There is no sustainable business model in the UK across the whole m-finance SSI: in the absence of institutional drivers for such a model, disruption

remains possible. If the telcos and banks can agree the governances for such a system, their primary position in the SSI governances may be restored, alternatively they may be disrupted by the entry of a major player like Apple or generalisation of a Barclays-type product.

1	Solution: all of the UK has wired Internet coverage, those areas without mobile network coverage are isolated rural settlements, the quality of connectivity varies. 99.6% of the population can access at least 2G and access (sometimes slowly) a wide range of m-payment services.
2	Institutional thickness: personal financial services are more highly regulated than apps and mobile connectivity. Institutional arrangements (UK Archive 2012) such as the payment of wages and benefits enforces bank account use. Institutions drive innovation targeting higher-end customers.
3	Complementarily arrangements to m-payment: the UK is globally competitive in Internet security, apps development and personal (and investment) financial services innovation as the Barclays case demonstrates. There is a close relationship between industry actor R&D and university research bases around Informatics products such as apps.
4	UK banks have low or non-existent charges, however, charges are high for additional services (such as overdrafts); banks choose their customers often by de-marketing poorer segments of society: high income individual and businesses are the banks preferred customers, for whom they provide a wide range of services, including traditionally non-Bank services.
5	Basic connectivity is high; most (3G) users can access highly interactive m-finance services via m-Internet or apps. M-payments are a major area of competition between banks e.g. RBS's GetCash app.
6	25% of UK m-Internet users access m-finance services, often via dedicated Bank app. Scope of services varies: the Barclays case indicates how m-banking is seen as competitive advantage.
7	Key governances and standards: whilst banks are regulated, non-bank organisations are opening banks (retailers), acting as banks (iTunes) or offering C2B payment services (including telcos).
8	Both banks and telcos compete for higher-value customers meaning those using a wider range of paid-for services.
9	UK banks and telcos are highly profitable firms squeeze costs by automating services.
10	M-finance firms (including banks) and telcos minimise risks using techniques such as credit scoring and high charges for some services, they trade profitably: risks are exogenous such as the banking crisis or over-paying for network licences.
11	Low cost alternatives (especially cloud-based) may disrupt, however, regulatory arrangements offer protection to banks and telcos.
12	Low cost cloud services may disrupt, however, regulation changes would disrupt more.
13	Banks and telcos currently exploit their existing customer base by expanding service ranges (NFC, PingIt), some organisations (Barclays) see innovation as giving competitive advantage.
14	R&D (often university-based e.g. automated credit scoring and meta data analysis) supporting automation drives down costs and increases margins. Telcos and banks seek to 'bundle' wider ranges of products, trading on brand.
15	Despite crises (banking, overpayment for licences, market entry e.g. by retailers) the major firms in the SSI survive profitably and internationalising.

Table 7.1 Key Parameters of the UK M-Payment SSI

Actors in the UK's m-payment SSI ideas space are far more varied than in India's case (see Figure 2.3 in Chapter Two). In the UK, they include the banks and other actors such as retailers or other 'brands' providing either full-range mobile financial services. This can be seen in Sainbury's m-payment or m-digital wallet apps, often with NFC capability, such as BP, transport, café-chain and parking companies. The ideas space is occupied by in-house and contract apps developers who sell or partner their technology to branded service providers, who often in turn cooperate with banks for back-office systems. Banks such as Lloyds are prone to partnerships, others such as RBS and Barclays operate only proprietary systems. The cost of altering legacy systems is more of an inhibitor to innovation than regulation. UK telcos, such as Weve, are now firmly part of an EU-wide telco network offering services across the Union and internationally. This is unlikely to protect their position as NFC and m-digital wallets that are overcoming the use of SIM cards as the best way to authorise identity.

Table 7.2 focuses on the 15 variables and applies it to the Indian M-Payment SSI. Variable two, India has institutional thickness whilst the banking is strongly regulated; non-financial institutions are inhibited from providing banking services. Thus, institutions support m-finance services to the poor in ways ant at costs making the services accessible. Therefore, institutions service a social justice agenda. Variable twelve, cloud is enhancing BoP focus business models by containing the costs of high transaction volumes. Variable 13 suggests that as the network expands so will the customer base. For India, variable 14 suggests that the service is focused on BoP customers and is highly innovative contextually, but it remains uncertain if business models focuses on these customers can be exportable or applied globally. Finally, for variable 15, certain firms business models appear to be sustainable as the rate of enrolment is greater than the rate of customer loss which improves incomes.

1	Solution: recognising the cost effectiveness of m-finance, the SSI is enabling the diffusion of mobile Internet-enabled solutions providing financial inclusion for un-banked citizens.
2	Institutional thickness: whilst banking is strongly regulated and non-banks inhibited from providing banking services, institutions support m-finance services to the poor in ways and at costs making them accessible: the institutions serve a social justice agenda.
3	Complementarily arrangements to m-mobile such as RBI regulations, NPCI infrastructure, Atom Technologies and TIBCO's data processing systems, for services such as Induslnd Bank and Eko Financial Services, using physical infrastructures (retail outlets, the 2G telephone network).
4	Customers able to pay charges are served by 3G-enabled m-finance technologies and services provided by the market. Bottom-of-the-pyramid customers can access simpler transaction services, using basic mobile devices leveraging either retail outlets (Eko) or the (numeric literacy) services of Induslnd Bank.
5	Basic (2G) connectivity remains a challenge – around 20% of the population have a mobile, half the have access, many of the 50% are in rural areas outside mobile network reach. 2G networks provide sufficient connectivity for basic m-finance services since firms are shaping services to align with the available technology and absence of banks.
6	Firms such as Induslnd Bank and Eko are sustainable business provided the volume of transactions is high and range of services narrow: it is likely that the scale of these services will continue to increase, with technical network reach a major constraint.
7	RBI strictly regulates banks; this obliges banks to support NPCI's infrastructure expansion IMPS (affecting telcos and banks) and inhibits 'cherry picking' market strategies by banks or organisations that would otherwise enter the market (such as major retailers or brand names e.g. Infosys, Tata). Governances suit the social justice agenda.
8	Indian telcos operate on low ARPU; for the BoP segment this is especially so.
9	Advanced technologies (NFC, complex payments) are limited to 3G users, mainly in urban areas. BoP services are cost sensitive and rely on scale economies and the intermediate/appropriate deployment of back-office technologies by firms such as Atom Technologies and TIBCO. Regulator pressure on telcos for network expansion imposes costs that they might otherwise choose not to bear.
10	Banks are protected from risks associate with services to BoP customers or businesses dealing with BoP customers (TIBCO) by intermediaries such as Induslnd Bank and Eko, who in turn minimise risk using retailer bonds or bank underwriting.
11	Basic service models will wither as people become richer: not a short-term prospect.
12	The Cloud (TIBCO) is enhancing the BoP business models by helping contain the costs of high transaction volumes.
13	As the network reach expands, so too will the customer base.
14	The sector, especially for BoP customers, is highly innovative, in context. Yet, how far the models are exportable is uncertain.
15	Eko and Induslnd Bank's business models appear sustainable, provided the rate of enrolment is greater than the rate of customer loss, as their incomes improve.

Table 7.2: Key Parameters of the Indian M-Payment SSI

Telcos in both India such as Bharat, Tata Indicom, Reliance, Idea Cellular and AirTel, and the UK, such as Vodafone, O2 and EE are being squeezed. Given the ubiquitous availability of banking, PoS access and the Internet in the UK, it is understandable that the telecommunications network is considered as a commodity

product; necessary as a background partner, but not new value-adding in the m-payment SSI. India's telcos occupy a more leading position in m-payment innovation; however, the strategic priorities are set by the state like extending the 2G network. In India, state policy rather than telcos are driving innovation – at NPCI's behest intermediaries occupy the SSI's ideas space.

Out of the technology firms of the case-firms, Atom Technologies is very innovative in the low-complexity application software development for mainframe systems, in particular for financial services. Thus, development incurs minimal cost and the risks are passed onto the banks and other financial firms. In essence, for Atom, it is more about moving old platforms to newer ones than creating an innovative process.

Indian banks are in danger of occupying commodity service space, holders of deposits and data, whereas the institutional arrangements in the UK enable entrants to become banks for example: retailers, branded companies in partnership with banks and credit card companies. Low 3G reach in India coupled with strong regulation is inhibiting banks from being innovative e.g. in apps, m-digital wallets and NFC, whereas the UK Barclays case in the UK, demonstrates a bank being radically innovative with their P2P transfers. From the viewpoint of unbanked non-customers, the SSI in India is innovative; however, intermediaries with NPCI's support drive innovations, rather than banks and telcos.

7.2.5 Policies and Institutions

Although this research is looking at the SSI and innovation process aspect of m-payment systems, governmental policies need to be taken into consideration since it can hinder or help the innovation process. Traditionally, those who have developed regulation or other kinds of policies are somewhat removed from those responsible for implementing it; a tradition for the UK, but necessarily for India. In the last decade, there have been a number of innovative developments in payment systems. Payment systems do take a role in maintaining the stability and efficiency of the financial system as well as preserving confidence in currencies. Yet, most retail payment systems are not considered important systematically since their potential

weaknesses in regard to security and reliability can affect the financial system as well as the economy. Thus, innovations in payment systems become a policy concern for central banks.

Previous research has shown that countries and sectors who suffer from weaker markets, limited professional capacities, and limited institutional networks need to have a more expansive government role (Breznitz and Zehavi, 2010). Specifically, there are studies that point out the different forms of interactions amongst sectoral elements with a greater focus on institutions, but these studies have taken into account the role of governments that influence innovation amongst firms (Fisher-Vanden and Terry, 2009). As such, by focusing on interactions in the sector among firms, institutions and technologies, Hall and Soskice (2001) have observed that institutions in more liberal market economies provide a better support system in encouraging innovation in emerging technologies which helps firms' competencies.

Recently, some researches have tried to provide a more direct evaluation of the impact of policies in the sector (Campos and Teixeira, 2004; Gutierrez-Gracia et al, 2002). Although their analyses point to the fact that incentives did not promote the accumulation as what was expected, their analysis is insufficient since there still calls for a need to better understand the specific organization development and the accumulation of capabilities inside the scope of policies. Sometimes, capabilities of firms can improve simply due to the investments in infrastructure by government and other policy actors. Yet, in both countries, government and institutional policies are co-evolving with the actors and technological capabilities. The UK is starting to implement more policies and India is relaxing their strict policies; dissimilar approaches of similar services.

Rather than generic global rules, practitioners, as well as theorists, concerned with how firms are designed need to acknowledge that there is a limited number of context specific configurations that can be applied to individual firms and their circumstances. It is not just a simple fit between knowledge, structure and performance because the relationships among these dimensions need to be

simultaneously taken into account the many possible variables and multiple organizational solutions. Thus, a key challenge for policy and policy makers is the dynamic understanding of the relationships between the actors especially the main actors and the knowledge flows with various aspects of technology.

By exploring these possible solutions, it becomes fundamental to the design of policies which can recognize and take advantage of specific organizational and contextual characteristics (Dunning, 1992; Kogut, 2002; Leonard-Barton, 1995). Different firms interact differently with normative institutions which points to an inconsistent nature of interactions. Concerning regulatory roadblocks, these surfaced as a primordial impediment of m-payment systems in both countries. Indian respondents discussed disabling certain aspects, yet it has been found in this research that enabling the regulatory environment enhances m-payment systems and increases activities.

Faulkner (2009) has highlighted the need for further research in understanding the influence of institutions on SSI systems and innovation processes. Yet, Faulkner (2009) points out that transnational policy institution in Europe may support innovation through what he calls constructive processes of regulatory ordering. Contrary to the common notion that the role of regulations is restrictive and limited mostly to monitoring innovation patterns within sectors. On the other hand, Boymal et al (2007) indicated that institutional setup in a country can hinder innovation when it is influenced by political aspects over socio-economic ones. This is a dividing factor between the two countries, but as what Vonortas (2002) has reviewed, more technological support can create policy consistencies, and involvement of all the actors can help firms innovate and enhance their competitiveness. However, the government must play a crucial role in m-payment systems although these policies are not innovation-oriented. Regulative institutions in the UK, while consistently present across the sector, have a weak enforcement. On the other hand, different firms experience different implementation mechanism for regulative institutions suggesting an inconsistency and can possibly lead to weak enforcement. Differences in the UK for regulative institutions suggest a lack of collective and consistent focus

as well as priorities on the part of the government in being regulatory authority as a whole.

In comparing policy structure between a developed and developing economy, Subrahmanya (2005) discusses that incremental product innovations mainly come from external sources. Yet, a weakness in Subrahamany's (2005) work is that sample selection procedures are not clearly elaborated. However, for this research, findings disagree with this assessment since certain firms in India such as NPCI, Atom Technologies and iKaaz are more innovative than firms in the UK like Barclays, Lloyds and Weve.

Edquist and Johnson (1997) discovered that when it comes to institutions in the SSI there are formal and informal. Although both countries certainly have formal institutions in regards of government and regulation, however for the UK, the regulation for m-payment systems seems to be, if anything, informal. This informal dynamic certain contributes to a transformation of the environment (Breschi and Malerba, 1997), but this is beginning to change as seen with Weve. Respondents suggest that in the UK, firms do not interact with regulative institutions on a regular basis, yet in India, seems to be a stronger relationship because RBI is trying to implement a standard process as seen in NPCI. RBI labels any kind of mobile money as a banking product, thus, it is not a telco product. According to RBI, this requires strict rules and they defend the decision that any telco entering the market to do m-banking or m-payment transactions, must partner with a bank. Like any other regulatory body, RBI is trying to protection customers.

Overall, governmental support is strong in both countries; just in different ways. India, though, is more concerned with regulatory approvals. This suggests that emerging economies take regulations seriously before their product is even commercialized as part of their institutional set-up. Furthermore, India seems to be taking important measures to avoid any kind of imitation strategy through their own patent innovations. Firms are able to capture value from their innovations. Telcos do not become a bank - although the existing regulation permit telcos and other

authorised payment system service providers as regulated by RBI under Payment & Settlement Systems Act, to provide pre paid wallets. Telcos in India are focussing on this segment and creating an ecosystem for acceptance. Much like NPCI was formed together by competing banks for a common cause, if telcos can come together and create a common acceptance infrastructure that is as interoperable as IMPS is then these prepaid operators and banks can connect to each other using NPCIs common infrastructure. Thus, this creates a standard ecosystem as well as interoperability.

7.2.6 Firms and Actors

Although in the last few years there have been a number of new developments in the payment system, very few innovations have had a significant effect in the market. There has been an increase, though, in the role of non-banks because of the growing use of innovative technology that allows non-banks to compete in areas not yet dominated by the banks. When non-banking firms are involved in the sector, these firms take on features of infrastructure. In other words, these firms perform a critical role for the entire sector of m-payments, but specifically, they are more focused on retail payments. However, when non-banks are used, there is a greater chance of catastrophic failure and security compromised, and thus, run a higher risk if lacking this capability or knowledge. Yet, the driving force of these innovations is owed to serving the financial inclusion or unbanked; it comes from either a government mandate or due to new business opportunities. Thus, while there are a myriad of drivers influencing firm-level engagement in m-payments across categories of actors, it is clear that these actors indeed recognize the significant value gained from actively participating in m-payment activities.

7.2.7 Knowledge and Learning

Knowledge covers a broad spectrum of informational components such as technical, market and managerial (Lyles and Salk, 1996), but it is commonly argued that innovation develops from the ability of firms to access a diverse range of knowledge resources to exploit in order to create goods and services (Hargadon and Sutton, 1997; Zaheer and Bell, 2005). Knowledge plays not only a central role in innovation, but also an interactive, absorbed role amongst the firms' capabilities in the service

chain. Knowledge can be internal or external to the sector and can relate heavily on technological opportunities depending on the accessibility of knowledge. Yet, external sources of knowledge such as suppliers and customers can play a crucial role in the service. Knowledge is produced by different actors, or firms. As what Alvesson and Karreman (2001) have said that knowledge tends to be separated from its context where it is depicted as an objectified entity of equal benefit in a variety of different contexts in the form of lessons learned and best practice. Depending on who these actors are in the service chain and how they access their knowledge is actually very crucial for the sector's and firms' innovative activities. Thus, heavy importance is on the interaction of firms who contribute knowledge to the actual innovation process. Yet, the importance of the external actors is going to change over time within the service. It does not matter which country the service is being applied in, because either way these interactions are already changing. In essence, though, changes are happing so rapidly that it makes for a weak ecosystem and lacks interoperability because it is confusing customers with inconceivable amount of options being presented to them within m-payments.

As Cross et al (2001) argues, often times, strategic partnerships are frequently created expressly for the purposes of innovation. These strategic partnerships provide access to a diverse range of knowledge and learning where it cannot typically be efficiently generated from internal means (Appleyard et al, 2006). Thus, strategic partnerships and collaborations are predictors of innovation. Relationships will determine the position of the firm among with whom they interact with. This position determines its access to valuable external knowledge resources as well as its control over those resources (Liu et al, 2005). However, often times, these relationships are visually depicted as weaving a web of innovation. Yet, firms can position themselves in these webs and combine internal as well as external knowledge resources where innovation is the result (Galaskiewicz, 1979). Although benefits of partnerships and collaboration between actors and firms are seemingly self-evident, the research identifies specific circumstances where these partnerships between firms and end-users promote innovation, specifically with the banks (RBS, Barclays, Lloyds) in the UK and Eko Financial Services in India. Although the banks want end-users to feel

as if the banks have created the technology in-house, the reality is that RBS, Barclays and Lloyds needed external partnerships since they lacked the technological knowledge of m-payment systems. However, these partnerships provide competitive advantage. In India these positional characteristics are stronger with banks and banking correspondents because of not only regulatory requirement of partnerships, but because certain firms like Eko is using knowledge to be innovative.

Really, the usage of technology and software firms, SSI is evolutionary in the sense that firms in both countries have progressed from simple functions to that of personal agents to agents able to operate across a network. In essence, the tech firms have created knowledge and learning capabilities from each other. Knowledge makes firms aware of strategic imperatives like competitors' actions and customers' desires (Nix et al, 2008). Hence, once knowledge is acquired it can be converted into actions such as innovation. It is capable of enhancing innovation, but in order to create competitive differentiation, it is rare and difficult to be efficiently developed by internal means single-handedly (Appleyard et al, 2006). Therefore, innovation requires a renewal of ideas in dynamic environments where knowledge is used to identify the means that satisfy customers demands (McDonough et al, 2008). As a result, certain firms are beginning to look externally for key innovation resources. This kind of acquisition, external knowledge, is relatively unexplored in regards of its contribution to innovation efforts.

In regards of knowledge process, research findings strongly contradict the notion behind knowledge process framework where they appear in a linear fashion. Knowledge process seems to be ongoing since there are various activities and people involved in the process at different times during the integration of the various services whether it is m-payment or m-digital wallet. Pentland (1995) described the interrelation between knowledge processes as links in a chain whereas Grover and Davenport (2001) depict knowledge processes in a figure as being linked through unilateral arrows.

The findings of this research suggest that there is no linear relation, and instead, each of the knowledge processes is ongoing occurring simultaneously throughout the integration of the services. For example, in the UK, the telecommunications industry is focused on upgrading to NFC and 4G capabilities. Banks and other software technology firms have to be focused with knowledge exchange since m-payment systems require more than one firm involved on the ecosystem. All the case- firms in for the UK certainly had some level of knowledge process, but it is weaker in the banks since they do not believe they will be threaten nor replaced by technology or telco firms. Monitise has the stronger knowledge process simply because their interaction with SSI is very central to the m-payment ecosystem since their customers range from other software firms, telcos and banks. In regards of India, though, they are a few years away from having NFC or 4G capabilities, banks, telcos and software technology firms still have knowledge exchange in order to learn from each to best service the customer regardless if the customer is unbanked or underbanked. However, Eko Financial Services has the stronger knowledge process because, like Monitise, they are very much in the middle of the ecosystem. Yet, unlike Monitise, Eko interacts with the end-user as well as being innovative in the back-office aspects of m-payment systems.

Knowledge in a system has exchanges and this can occur among different sectors and firms because of the sectoral proximity, and thus, forms patterns of innovation. All knowledge comes alive to the amount that actors have to rely on their senses to perceive and manipulate external objects. However, there is difficulty in seeing these patterns and external object. For instance, small firms that operate in traditional sectors such as the banking sector lack absorptive capacity to internalize knowledge from external sources. The role of technology intermediaries such as software firms is core because they help organize absorptive capacity at a collective level (Spithoven et al, 2010). Firms with greater absorptive capacity as well as priority of spill-over aspects cooperate more with other firms and other actors for innovation (de Faria et al, 2010). Thus, firms can become trend setters or global leader in their business models if they are able to innovate successfully by putting forward new interpretations of existing combinations of product inputs.

Knowledge seems to be evolving more in m-digital payments and m-payment systems, but remain stagnant in m-banking at both firm-level and sector-level. The reason knowledge is evolving in these particular aspects of m-payment systems are because there are more partnerships formulating such as Weve in the UK and Vodafone with ICICI Bank in India. There is a strong influence of technology firms in both countries such as Monitise in the UK and Eko in India. If anything, these knowledge exchanges should result in more incremental innovations for these services.

Knowledge and learning are individual-oriented. Learning processes are predominantly informal, and thus, interactions with learning processes are also informal. In comparing the two countries, learning processes seem to be more informal in India than in the UK because the developmental structure of the individual countries. Knowledge does not reside with a firm, but instead with the individual workers. Firms in India have more interactions with the end-users and thus, are gaining more tangible knowledge as compared to the firms in the UK.

Besides learning, knowledge acquisition has been shown in research that it often leads to a race between partners to acquire each other's knowledge faster than the other can acquire theirs (Hamel et al, 1989). Frequently, though, such races are seen in international collaborative relationships where firms compete to acquire knowledge and skill set of their partners. In other words, local firm seek to acquire technological and knowledge skills of their MNC partner while the MNC partner is interested in acquiring the knowledge to compete in the local market from their local partner (Hamel, 1991). This is seen more so in India than in the UK. However, Indian firms are starting to make global headway to reverse this trend, for example, seen with iKaaz who have expanded their market to include the US.

7.2.8 Technology

A sectoral system in regards of its structure and institutions bring incremental and substantial changes through new technologies. Christensen et al (2005) observed that

the way firms manage new technologies is influenced by their relative position within the sector and the level of maturity of technological regime. For instance, small firms initiate new technologies, but large firms take over who later improve and mature the technology through an evolutionary period. The evolutionary period of technology is where institutions as well as technology develops and accumulates capabilities that deal with current evolving situations. This implies that the evolutionary process of capabilities solves problems by improving the performance of the technology in order to satisfy needs and demands. Yet, a time may be reached when these accumulated capabilities lead to saturation of said capabilities and instead improving technology becomes incremental to where it does not solve the emerging and critical problems faced by end-users. Thus, this becomes a fertile ground to create a radical shift (Tushman and Anderson, 1986).

Financial institutions and other financial actors should begin to look at interoperability in such a way that is mutually beneficial rather than solely competitive. In the UK, there are now lots of different m-payment firms using technologies that all seem to be the same, but have different ways of verifying who the customers are. Thus, there needs to at least be an agreement on some common standards. Weve, created in partnerships of the telcos in the UK, is counteracting the abundance of financial institutions and other financial intermediaries in the UK who have created a complex landscape with respect to the convergence of diverse, independent industries within m-payment systems. Therefore, industry collaboration, harmonizing technologies, and enabling interoperability via open industry standards are all essential if ubiquity, concept familiarity, reliability and robust security are all to be achieved, yet even as some firms will always try to circumvent standards to get their proprietary tech to be the de facto standard.

Technology for m-payment systems in the UK is increasing at a higher rate than computers. Even so, with the increase of technology for this sector come fears of how safe it is to utilize it. In particular, the FCA is concerned about third party firms that help support the suppliers' IT infrastructure. Additionally, the FCA is also worried about the widespread potential for mistakes that end-users make since with

certain banking applications, there is a greater chance that consumers encounter difficulties in using the service as compared with more traditional services. Thus, government is aware of these potential pitfalls, but has not yet acted on these possible problems. UK Payments Council has said that by spring 2014, UK mobile users will be able to send and receive money by sharing only their phone number. Accordingly, this will bring the UK up to speed with technology long in use in the developing countries. It has taken the UK longer to actually catch-up due to the technical challenge of building and testing a new database to power the system. As seen in Barclay's Pingit, the system will mean people can send and receive money to others by sharing just their mobile number rather than having to swap other details such as sort code or account number.

For India, some technologies such as cloud computing, data deduplication and virtualization will enable new ways of doing business across industries. This will result in a major shift in industry dynamics and lead to creation of new and improved sustainable ecosystem. New investments in immersive group systems are increasingly being replaced by investments in personal and executive systems. India's IT policy constantly wants to make the IT infrastructure stronger and encourages public-private partnerships or collaborations in order to accomplish this. The government appears to be more open in looking at how to bring governmental services via different channels.

NFC has potential for future growth since it supports faster payment processing which can potentially increase user convenience and efficiency. The advantage, though, will be with globally active players since they can leverage their coverage and market power when offering payment solutions. In many cases, innovations in retail payments represent only incremental improvements to existing and established payment services, but large leaps can occur, especially in countries where the payment infrastructure is underdeveloped.

7.2.9 Business Models

Firms must decide whether they will lead the sector and industry or merely become an active competitor. In order to be differentiated as a market leader, firms need a well-conceived business plan and innovation strategy (Sheasley, 1997). Business models are imperative for firms across the globe given the need to penetrate untapped consumers in emerging markets, especially the unbanked. Business model transformations and innovation include stalled developed country economies, proliferation of disruptive technologies and related innovations in all sectors (Casadesus-Masanell and Ricart, 2010). Of the business models discussed earlier in Chapter Five, it does not matter which model is being utilized because it is imperative that convergence between multiple sectors and actors take place in order to facilitate an end-to-end m-payment solution. Firms must embrace these new business models in order to accomplish this solution by deploying them collaboratively, with agreement and support of all parties involved through inter-organizational alliances. Although the process is extensive and arduous, the returns outweigh the process.

There are four core business models, within the SSI M-Payment, but not all of these models can be applied to both the UK and India. The models understood from this research are bank-centric, peer-to-peer, and collaboration as shown in the following tables (Table 7.3, Table 7.4, Table 7.5). Templates of the tables are adopted from the Smart Card Alliance White Paper (2008) although the analysis of the case-firms has been done for this research. The template discusses the positives and negatives of each respective business model being utilized. Since an m-payment system involves many actors within the service chain, there are many stakeholders affected within the innovative process. For instance, if the dominate business model is the bank-centric model, then there are going to be more positives from the bank's perspective than negatives. In addition, the telco is most likely going to have more negatives than positives in this business model. As for the end-user, there is an equal balance of both positives and negatives. By listing the positives and negatives, it actually gives users a better idea of whose service they should choose; or to what advantage a customer will gain over using mainly a bank's service as compared to using a telco's m-payment service. The end-user is noted instead of customer simply because some

of the firms' customers could be other firms and do not necessarily have the final relationship with the end-user.

Table 7.3 is the bank-centric model where the bank owns the relationship with the customer and is responsible for getting the payment to the customer's account.

Stake-holder	Positives	Negatives
Bank	reduced cash/check handling; new customers (unbanked/underbanked); improved security features; customer value relationship/retention	lack knowledge/experience in app develop/mobile function; added cost of apps for multiple mobiles platforms (Apple/Android); paying fees to telcos;
Telco	increase in data transactions volumes/revenues; Potential incentive fees for new customers	bypassed; knowledge is minimal when banks lead
Merch-ant	reduced cash-handling cost/counterfeit; increased cashier efficiency; increased consumer impulse spending	commissions/transaction fees for low-value transactions; tech upgrade card-based transactions due to interchange
End-user	Speed/convenience; alternative to costly ATM fees	limited to specific bank offering a service – may not be permitted to add other applications

Table 7.3 Bank-Centric Model
Source: Adapted from Smart Card Alliance (2008)

Table 7.4 is the peer-to-peer model that is used by newer firms who are trying to develop faster transfers in processing payments without using wire transfer and bank card processing networks.

Stake-holder	Positives	Negatives
Bank	revenue from processing fees; access to broader set of customers; potential partnerships	service provider can use other bank as payment processor; lack of visibility; certification of device security
Telco	increase in data transaction volumes; potential partner with app developer	disintermediation from m-payments value chain; customer service issues
P2P Service Provider	revenue from transaction fees/commissions; marketing revenues; cross-sell opportunities	significant entry costs to gain wide acceptance by customers; assumption of risk for theft/fraud
Merch-ant	reduced cost handle fees/ increased processing speed; faster payments; access to loyalty programs	new service provider with limited equity in reputation; risk of loss in case of dispute or fraud
End-user	potential for less expensive remittance/payment option; inexpensive or free	transfer funds to P2P provider; need to manage new bill; difficulty of managing disputes

Table 7.4 Peer-to-Peer Model
Source: Adapted from Smart Card Alliance (2008)

Table 7.5 is the collaboration model where collaboration among banks, financial institutions, telcos and other stakeholders in the value chain are taking place.

Stake-holder	Positives	Negatives
Bank	alternative channel**;** additional revenue from transactions**;** potential for new customers	less need for ATMs; lowered ATM revenue; investments in creating applications
Telco	core competency; potential for new customer acquisition; revenue from transactions and data transmission	complexity of cost/time of negotiating with banks/association
Merchant	faster transaction times; reduced cash handling costs/queues; customer satisfaction; targeted marketing and loyalty programs	transaction fees in place of cash
End-user	banking services available from preferred bank; reduced wait time; convenience	need to obtain and activate bank-specific application on device

Table 7.5 Collaboration Model
Source: Adapted from Smart Card Alliance (2008)

Table 7.6 displays the firms who are or were using the business models at the time of data collection. Four firms use the bank-centric model, two firms use the peer-to-peer model and seven firms use the collaborative model.

Business Models of Case-Firms	
Bank-centric	RBS, Lloyds, Barclays, Induslnd
Peer-to-peer	NPCI, iKaaz
Collaborative	TIBCO, Monitise, Atom Technologies, Eko, Mahindra Comviva, Idea Cellular, Beam

Table 7.6 Business Models of Case-Firms

Zott (2001) pointed out that once business models are utilized, it becomes more difficult to adapt (Dweck, 2006), however for SSI, firms have to be adaptive if they are to gain a competitive advantage and be efficient. Banks in the UK are certainly making the necessary changes to accommodate consumer demand, but they have to or else they risk losing their customers. In reviewing Lecocq et al's (2006) RCOV framework, relationships between resources and competencies are going to change business models.

The similarities between the two countries are striking, yet there are underlying differences as well. In India, the leading suppliers and providers have access to the USSD channels which can reach at least 90% of the mobile subscribers. In exchange for USSD access, telcos will typically receive a certain percentage of revenues. However, the telcos are not driving the business. When there are both small and large firms competing in the same sector to try to become the technology leader, the small firms have smaller scales to recover their investment costs. Hence, the current difference in capability from the leading firms deters the smaller ones from easily becoming more advanced in regards of investing at or beyond the technology leader's capability. Yet, merely becoming a leading firm does not equal profitability. With de-regulation in place, the financial service industry in the UK has witnessed several mergers and closures in addition to an increase of joint ventures with other service providers (Thorburn, 2008). Moreover, this increased competition because strategies and business models were redesigned to capture the value of their customers (Sensarma, 2008).

India's business models based around high-volume, low-cost services are more innovative than the UK, where data transfer contracts accessed by look-alike apps dominates m-finance, perhaps understandably since many people prefer to do Internet banking and home and restrict m-finance to micro-payments. However, regardless of the business model used, it is essential that convergence between multiple actors from the various industries take place in order to facilitate the service. Therefore, firms have to embrace these newer kinds of business models as they deploy them collaboratively in inter-organizational alliance.

A newer model is on the rise, the business correspondent model. This model is supplementary to the bank-led model because it focuses on the financial inclusive. The BC model operates as micro-banks in rural and remote areas of India. It exploits new functionality available through a mobile that acts as a delivery channel. Eko uses this model for their agent network along with collaboration. Each of the Indian cases reveals a unique business model; the UK SSI is innovative, however not in business models, rather channels the m-digital wallet, NFC and applications. Each

SSI shows itself capable of generating radical and incremental innovations. An advantage of flexibility in business models is that as new coalitions come into being, the distribution of value in the chain can alter. UK business models are bank-centric or mobile network centric with more collaborative models such as the m-digital wallets and NFC growing in popularity, and independent operators, like retailers etc., in direct competition with banks and network providers. Again, the governances of the UK SSI has retarded the growth of collaborative models whilst the Indian system encourages them, though Indian business models have yet to achieve national, as opposed to regional, standards. It may be that the emergent collaborate UK business models become the dominant.

In summary, the first research question focuses on SSI and how SSI shapes the business models employed in m-payment systems. The SSI approach is able to provide a better understanding of how the various dimensions have to work together in order to create a more solid ecosystem and stronger interoperability. In particular, the production process of firms cannot be replicated in other countries regardless if it is a developed or developing country.

7.3 Answer to Research Question 2: Service Innovation

Research Question Two is: *why and to what extent do the processes of service innovation differ between m-payment systems as explained in the UK and India?* The inspiration for this question comes from literature on service innovation and m-payment systems. Once again, service innovation is either a service product or service process that is based on technology or a systemic method. Thus, in services the innovation does not necessarily relate to the technology itself, but often, it lies in non-technological areas. Therefore, service innovation can be new solutions in the customer interface, new distribution methods, novel application of technology in the innovation process, new forms with the supply chain, and/or new ways to organize and manage services.

Originally, the term innovation was devised as a way to distinguish the process of invention from commercialization (Freeman and Soete, 1997) since invention and

commercialization can occur in various stages of the innovation process. As seen in the research, from the telecommunication perspective (Fransman, 2002), the role of the customer is not well explored. Case in point, the customer is usually treated as a homogeneous entity since it is seen that there is no difference between mass consumption and large corporations, yet there is a tendency to refer to mass consumption when referring to customers. There is a predominance of the supply side where little attention is paid to the role of the customer in the innovation of services. This is because studies on service research focus on either the customer from a marketing perspective or providers from an operations perspective because disciplines tend to focus on specific sectors whereas marketing tends to focus on business-to-consumer and business-to-business operations.

Innovation in services has been classified as either incremental, changes perceived to be minor, or radical, changes perceived to be major (Scheuing and Johnson, 1989; Garcia and Calantone, 2002; Herman et al, 2006). Yet, for this research, there are aspects of both categories of services being deployed in order to meet specific needs expressed by customers. Although, specifically, financial innovations are not confined to just one quadrant of Francis and Bessant's (2005) 4Ps framework, product, process, position and paradigm, for exploring innovation space. However, it seems most financial innovations are sat at the product and process quadrants. To this end, firms seem to use aspects of new product/process development approaches coupled with stage gating techniques when creating financial innovations.

Innovation can grow and incorporate a subtle discipline mechanism in people to increase savings. With regard to stakeholders, a complex interactive web has been identified to exist. This is because most stakeholders, individuals, financial institutions, non-financial institutions, technology-related institutions, governments etc., play multiple roles, for example innovators, end-users, intermediaries etc., at different times and at the same time. In summary it can be said that the financial innovation landscape is poorly characterized as no formal model for financial innovation exists.

Findings suggest that the strategic deployment of innovative services in the UK is based primarily on satisfying the needs of the sector or marketplace rather than restricting service development to fit the current firm's competencies. Consequently, in India, innovative services are more about focusing on the needs of a specific stakeholder group. Innovation and firm's resources and capabilities are employed in order to gain a competitive advantage and profit for firms, but the financial return for firms involved in this service chain have yet to provide a financial return. Certain firms have possibly shown a small return, but firms are still struggling to showcase a profit in the service context of m-payment systems in both countries. Overall, from the banks perspective in the two countries, the bigger threat is from Internet and technology/software firms; not the telcos. Although, the less security the technology platform is, the more banks and telcos need to institute complementary operational security measures. It really comes down to customer engagement.

For the global perspective, certain technology firms such as TIBCO, Monitise, iKaaz, Atom Technologies, Eko, and Mahindra Comviva have shown that new payment systems overall face three big hurdles for success. These hurdles create a better alternative that is simply, fast, secure, in control, cost effective and reliable; drive adoption to change habits and trigger network effects; and lastly, are viable in achieve scale and developing a business model that works for all parties that can generate profit.

Mobile phones are creative devices, but these devices cannot alter cash into electronic value or dispense cash. Mobile phones are used only to transfer and transform value electronically. Therefore, an m-payment platform or ecosystem needs to be supported with a cash exchange platform. Thus, a mobile phone can replace specific devices: a bankcard, a PoS terminal, a human ATM and internet banking terminal. The choice of application environment affects the service and performance such as user interface, speed of service, ease of setup and ease of upgrading. From the customer perspective, m-payment is purely a cash-to-cash service. In what happens in between, the technological, electronic process in the middle is purely a matter of efficiency for the service supplier who processes the

remittance or the government in paying out their social welfare. At the end of the process, all the customer knows is that the ability to access money is less time consuming, and possibly, easier.

Research findings from reviewing secondary literature seem to show complexity and reconfiguration are emerging themes in the financial innovation process. It is no shock, therefore, that financial innovations, especially in the 20th and 21st century, have mainly been about using already existing instruments, practices and technologies in new ways. The unbundling of risks and characteristics of already existing products to form new combinations has also been another major approach that has contributed current financial innovations.

Process innovation have several aspects of the development stage (Pullman et al, 2001) if the innovation will be successfully implemented (Klein and Sorra, 1996), but success may not equal profits. Every firm interviewed in both countries say they have the best m-payment system. However, the UK firms have said that it is too early to tell with the technology if there will be success or profit; whereas in India there is unilateral agreement that profit will be obtained even when certain firms could not follow-up with how profit will earned.

Being able to profit from innovation is a major incentive to invest in innovation activities regardless of the type of innovation. Achieving this goal requires quite a few factors to fall into place. The firm has to be able to generate relevant innovations, it has to have the capabilities to commercialize its creations, and it has to know how to expand the time during which competing firms cannot diminish its profits by presenting similar innovations to the markets. Sensing and predicting what customers and markets desire may be equally difficult, or easy, for both product and service providers. However, during the phase of introducing the innovation, there are already differences; it may be much more difficult to describe and demonstrate beforehand the benefits of a service innovation that will only exist when the customer buys and utilizes it (Zeithaml et al., 1985).

In the UK, m-payments have three various components: the service component, the origination component and the transaction component. It is up to the firms such as the banks and telcos to differentiate these components. Regulation is seen as an opportunity to leverage and build very secure and fast transfers, still more often than not, regulation has a negative effect; but it is an underlying principal. In regards of the wallet, there is no industry standard yet. Firms need to look at the distribution value chain of the payment systems and what the customer actually wants from the service. Banks see the B2B payment segment earning more profit, but if one looks at Barclay's Pingit, it is an m-payment, not m-banking solution because there has to be an individual at the other end of the transaction. The idea of Pingit is based on individual usage where it can be described as a lead-in proposition because it will lead other consumers into using it. For India, one does not need clever technology; just needs something that is simple and it works. Thus, USSD and SMS, the humble text message, has come into its own as compared to smartphone technology.

7.3.1 Thematic Analysis of the Drivers of Innovation

Whilst the identification of themes helps to organize the data to make better sense of it, it is important to note that the emergent themes were not mutually exclusive. In other words, some of the innovation aspects described did not fit discretely into any one theme or category, but mapped across a number of themes. The engagement of m-payment systems is not driven by the need to facilitate financial inclusion or to develop the economy, but rather, by competitive pressures and consumer preferences. However, the system can be characterized by an intricate, complicated existing payment infrastructure that is marked by institutional complexities.

Themes were organized into categories in common groups and then assigned a descriptor for each group. At times, when appropriate, some of the data was re-coded based upon the review of the category groups and emerging themes. Some of the data was either given a new code or given multiple codes. By the end of this process, a new coding matrix (see Appendix D) was created which reflected the most recent code associations. This connected the themes to the interview questions in order to answer the research questions.

The payment system is a complicated interaction where firms need to build their service off of engagement with their customers. The most surprising category, or node, that arose was customers. Indeed, in the two countries, firms, no matter from the bank, telco or technology perspective, are more focused on customer segment and less on about being innovative. Without a doubt, innovation is an important theme and a core driver for the service, yet the term customers was repeated the most after word matrix analysis from the data transcriptions.

Drivers of payment systems are technological developments, user behaviour and regulation. The most important being user demand since it is the basis for businesses increasing their capabilities and potential revenues in producing the services. One cannot ignore the regulatory framework has an important influence since payment markets tend to be oligopolistic. The research found, though, that the Indian government has made it a priority to be involved in a detail manner when it comes to any kind of m-payment system; whereas the UK government is not as specific with who needs to be involved in the service. This aspect alone gives a contrasting division in what country will become more innovative than the other. The endogenous factors are cooperation and standardization since common standards can help to achieve a necessary critical mass adoption and create stable ground for new players entering the sector. The focus has to be on cooperation that can help reduce costs thru shared agreements, yet their effects on innovation will vary with differing circumstances. In additional, security cannot be ignored. Indeed if there is inadequate security, this could undermine confidence from customers in the service and the firm's capabilities.

Four key drivers of innovation were identified: supplier, demand, regulation, and technology. It was expressed that suppliers of the service will vary depending on what the specification of the service is and the technology being used. Others were more focused on creating demand for not just end-users but for other firms in the service chain. Regulation always has an impact on innovation when it deals with financial service industry and many responses to questions focused on how firms

work within the regulatory framework in both countries. Finally, the technological impact of the innovation process is probably the most important of the drivers because without certain technologies, firms would not be able to provide their service.

7.3.1.1 Supplier

M-payment services are not a commodity because if it was, then it would be standardized on a global level with no interoperability issues. Yet offers from different suppliers or providers can easily be comparable and interchangeable. Significant effort is required to create awareness pertaining to m-payment value propositions in order to increase consumers and supplier engagement. It is how banks brand and market their service that differentiates it from other banks; how banks market their proposition. It is assumed that the buyer, or customer, would perceive all service suppliers to be the same, and vice-versa in that suppliers would assume that they are supplying identical service. Thus, the core of services comes down to pleasing the consumer where the differences are really advertising and marketing. Thus, the key to increasing the usage of m-payment services is to differentiate it from other traditional forms of payments; not necessarily from other providers. This rests, in part, in the ability to showcase the service and to communicate the considerable benefits of the service as compared to more traditional ways of payments.

To some degree, innovation is about the supplier's attempts to meet unsatisfied needs or to make customers and consumers aware of the potential needs of new products or services. For this reason, suppliers have to gather customer information in order to learn how their innovation can fulfil customers' needs. Therefore, customers' preferences as well as market responses will set the boundaries of the suppliers' innovations. Conversely, though, the suppliers' ability to detect customers' needs has some limitations. Firstly, the kind of customers suppliers want or market to can be biased. Secondly, in order to find out customers' needs, the collection of the data consumes time and resources. Thirdly, the needs of the customers can only be discovered when suppliers interact with users directly. Thus, it is reasonably to assume in which only existing or target customers or users have a very strong influence on the direction of each firms' innovation.

By comparing a developed county and an emerging economy, this research is trying to discover if the service follows similar development, knowledge acquirement and accumulated technological capabilities in a dynamic competitive environment. In the last two decades, the service sector has emerged as one of the most promising sectors in India because of the strength of IT. However, despite some examples, most of the service firms working in m-payment systems are still fragmented in dispersed, small firms that lack the characteristics to reach the international market. Suppliers and providers of any of the m-payment services are not a problem in both countries. If anything, data showed that consumer education and awareness is a major concern.

To summarize, suppliers in the same sector do not always have the same resources or knowledge. Firms can choose different sets of activities to operate and add value to the service. Yet, a change in the supporting technology, which includes the introduction of new technology or the obsolescence of existing technology, can or will alter the composition of the sectoral system.

7.3.1.2 Demand

In previous research, it has been shown that firms responding more to customer needs offer more incremental innovations rather than radical (Salavou, 2002). However, Debruyne et al (2002) stated that it really comes down to price changes, which are the most frequent response of competitors to product innovations. Eko follows Salavou's (2002) concept in using the least common denominator to increase customers. Eko focused on the behaviour of mobile phone users in order to get a sense of what users habits are in regards mobiles. They discovered that USSD is used more so than SMS. USSD creates a hidden barrier which looks just like SMS and works faster than SMS. It works like Skype as opposed to working like e-mail. SMS is similar to email because it goes to a mailbox and then gets forwarded on from that mailbox to other mailbox. Overall, using USSD is part of consumer behaviour which is related to literacy and learning because it involves the dialling of numbers.

It is very difficult to predict the demand side. People in India deposit money into their account and immediately withdraw in full. There seems to be a lack of understanding of the system becoming a store of value account for safekeeping in acting like a savings instead of acting like a preferred means of payment. This is a problem for the banks in getting people to focus on savings, but not for the telcos who make revenues off of the transfers. Possible lack of strength is that any kind of e-money or m-payment lacks a sense of control that people can feel over their money.

Most of the firms researched have not triggered new demand or created new needs for consumers. Indeed, the contributing factor to take away is that certain firm's have weak market orientation. Some firms, especially in India, are able to create new demand by interacting with end-users and consumers outside the local market (Eko, Idea Cellular). For the UK, the key to m-payment engagement rests, in part, in the ability of marketers to communicate the benefits of the alternative payment method while, at the same time, clearly differentiating m-payments from other traditional forms of payment systems.

Undoubtedly, the needs of multiple stakeholders within the m-payment context are being met simultaneously. In particular, m-payments satisfy government requirements for traceability, accountability and transparency with respect to financial transactions while diminishing "informal" economic activities. Additionally, m-payments enable millions of unbanked and underbanked consumers and suppliers to easily access the formal financial sector via mobile phones given the dearth of traditional financial outlets within their reach. Further, cashless transactions increase security for consumers and suppliers while simultaneously reducing the threat of violence and physical harm at the hands of thieves.

Strength for firms will be the relationship between the merchant and the customer where intermediary firms such as Visa and Mastercard lack the innovation to be a player in the sector. Historically, merchants use to run the payment systems until credit card companies entered the space. Now, these credit card companies are not needed since firms who are not in the business of payments are gaining new

knowledge to provide payment services (Google, Amazon, Starbucks, Paypal). Thus, customers have power in regards of the transparency and understanding of the market.

7.3.1.3 Regulation

Regulation, ultimately, impacts the customers and can potentially be a more convenient or innovative service from the banking perspective. Additionally, banks would like to see a so-called level playing field where everyone is impacted in the sector by the same regulation. However, one needs to keep in mind that regulation is there to protect consumers. Whilst regulation might slightly impact a bank's revenues, it should impact telcos and technology/software firms as well so it does not turn into a competitive advantage to be gained. Regulations are necessary, but undo burdens will hurt more than help.

In both countries, generally, the primary factor hampering m-payments is the prevailing regulatory environment. Although some mention of absence of industry standards, it comes down to the regulatory environment. This is interesting to note because one country is more lax, UK, whereas the other country is more controlled, India. Yet, both countries come across saying that changes need to be done because of regulatory road blocks. Yet, from the government perspective, there is more focus on three aspects: the slow adoption of certain technologies, industry standards and infrastructure voids.

7.3.1.4 Technology

Theoretically, there has been a gap between technological innovations and how individuals and firms use innovation effectively. Technology does not work additively. The structure needs to have a core platform that can handle a basic set of defined transactions that are fast, scalable, safe and reliable. It comes down to service management in who is able to build on customer experiences. The service should be designed around the customers' usage that incorporates interfaces of third party firms that will add value to the financial institutions' customers.

In India, most mobile payment platforms are built and designed for the unbanked. These platforms are not constrained by legacy architectures and so are built using current, modern day, real-time switching platforms. Payment services for the unbanked, whilst they are usually very simple, offer the same core features that m-banking services provide: account balance, paying another person account or bill payment; only they do not require a smartphone to operate. These payment systems make use of the ubiquitous technologies including USSD and SMS which can operate on all mobile networks and are supported by all makes and model of mobile phones. Thus, instantaneous funds transfers between accounts enable them to provide more features and value to the user.

7.3.1.5 Cross-Case Analysis

In this section, data across all of the cases are analysed in order to identify similarities and differences in the service innovation. By identifying similarities and differences, the research seeks to provide further insight into issues concerning the m-payment systems. The research discusses how cross-case analysis enhances capacities to understand how relationships may exist among discrete cases, accumulate knowledge from the original case, refine and develop concepts (Ragin, 1997). The drivers of innovation classification have been made inductively based on the results of the coding of the data. This classification, or themes, was previously discussed in Chapter Four thematic analysis in specifically describing how the cases were to be presented in an organized manner. With m-payments, an innovative payment transaction is created through the usage of a mobile phone. Indeed, the supplier of this service is a driver as well as the technology that becomes necessary means within the service. New market demands replace the maturing of older services while institutional factors, for example regulation, influence the innovation outcome, and technology is an innovative aspect.

In regards of supplier, every case firm supplies a certain process to the service chain, but some firms interact directly with the end-user; and other firms are part of the back-end process. Of the firms who have the interaction with the end-user, these are case firms: 3, 4, 5, 6, 10, 11, and 13. These firms are part of the back-end process,

and as such are focused on platform hosting: 2, 6, 8, 9, 11, and 12. As one can see, Case Firm 11, Idea Cellular does platform hosting as well as interacts with the end-user. For the demand theme, all the firms have a customer to serve. It is a matter of whom and what kind of customer do firms collaborate with or how do they supply the service.

In terms of regulation, the two countries have a different regulatory reaction to m-payment systems. As what was discussed in Chapter Five, majority of the firms in India have to respond to regulation and it affects how firms are innovative in the service process. For instance, Case Firm 7, Atom Technologies, works between the banks and merchants in providing their IMPS operations. Atom Technologies though is not affected directly by regulation since they do not have the final relationship with the end-user. Some firms are more affected by financial (3, 4, 5, 7, 8, and 11) and other firms are affected by telecommunication regulation (9, 11, and 12).

For the technology theme, all the firms have technological capabilities in being in the service chain. However, certain firms are more innovative than others. Case Firms 5, 6, 8, 12 and 13 has created a stronger innovative service compared to the other firms. These firms, Barclays, NPCI, Eko, iKaaz, and Beam have stood out as becoming innovative leaders for m-payment systems.

The aim of using case studies was to gain as much knowledge as possible on the innovation process as well as the development of innovative services within m-payment system. Each case is unique in some respect and there may be national in addition to sectoral differences. However, the need to emphasize national differences is not a focal point for cross-case analysis. Instead the focus is on what part each firm plays within the service process. The aim of the cross-case analysis is to identify common patterns that emerge across the cases and represent a basis for generalization of the findings. This was especially useful for capturing the occurrence of specific technology within the innovation process. In addition, cross-case analysis provides opportunities to learn from different cases and gather critical evidence to modify policy.

7.4 The Nature of Innovation in the UK and Indian M-Payment Sector

In comparing the SSIs in their ability to internationalise, several aspects must be taken into consideration. Financial services embody cultural proclivities and are difficult to internationalise, though currency exchange and micro-payments may prove the exception. Barclays P2P transfer services is clearly capable of internationalisation, the Indian systems less so, like mPESA it depends on nation communications networks and signals via texting. The EU Directives on m-payments are designed to encourage single-market internationalisation, but only via call-centres. Other countries' m-finance systems also struggle to internationalise: in the case of Japan because it is too advanced. Korea's Danal m-payments system is targeting other Asian markets. The Chinese Government, like India's, has targets non-banked people in encouraging Alipay, China M-World, an m-wallet and Monternet, a network billing micropayments system, SmartPay in China supports P2P transfers and is already rolling out in the Philippines. Third-party payments are the driver in the Chinese m-finance SSI. It seems unlikely, that either the UK products, confined to the EU, or the Indian products, confined to India, will rapidly internationalise, though in India's case, firms offering back-office support may join international consortia offer m-finance services.

The importance of branding in sectors where consumer trust and recognition are important cannot be underestimated. By customer numbers, the Agricultural Bank of China (ABC) is the largest (320 million), followed by the Industrial and Commercial Bank of China (282) and Citigroup (200); RBS has 23 million; Baroda a similar number. ABC's customer base is equal that of iTunes and Amazon which enjoy, outside of China, much higher brand recognition. Thus, one can ask if it is possible that a disruptive player will enter the m-finance sector with a global standard to completely alter the nature of m-finance innovation. Over the last three decades in India, payment systems have grown in regards of size, technology, innovation, product offering, channels, etc. M-payment systems have increased in both supply and demand, but it is facing the situation wherein there are too many solutions and standards with lack of marketing power. There are more players in the ecosystem due

to tighter regulation. However, most innovations have been driven with the regulator at the helm. M-payment systems are poised to leap into a higher trajectory driven largely by new technologies and new business models as well as societal and demographic factors which should be taken into consideration.

7.5 Exploring the Key Differences

Since this research was exploratory, the researcher had assumed that innovation would be a major theme or discussion in both countries, but it was not. Instead, the data revealed that engagement with customers and collaborations were heavily focused. Not surprisingly, m-payment engagement in the UK is not primarily driven by the need to facilitate financial inclusion or to develop the economy. Rather, it is more so driven by competitive pressures and consumer preferences for faster transaction speeds, simplified transactions and consumer convenience. Moreover, engagement in m-payments in the UK is also driven by a desire to proliferate new technological innovations. Clearly, developed countries do not suffer from the infrastructure and institutional voids that characterize the emerging market context such as in India. Instead, the UK is characterized by an intricate, complicated existing payment infrastructure marked by institutional complexities.

There are significant difference between launching m-payment services in a developed country and a developing country. For the developing country, there is much higher percentage of unbanked population where, generally, financial institutions do not have access to robust customer information. This, in turn, reduces the service options for firms especially in the extension of credit facilities. In addition, mobile phones tend to be less advanced where WAP and application-based solutions are not universally applicable in all markets. Therefore, for financial institutions that are able to be innovative in developing low technology solutions, the developing country offers much more massive opportunities. The innovative service for m-payment systems is much harder to explain in the developing country where regulation and financial literacy have to be considered in order to refine the business model to get it right.

Insights from the interviews show that there are general drivers of this service where the commonalities among the various actors are competitive pressures. In the UK, firms discussed more about the proliferation of technology and increasing the transaction speed to a simplify process. Whereas, in India, emphasizes focused on obtaining a profitable level. Although, to be fair, more emphasize is placed on the unbanked population in India because of the government policies and regulation. Yet, surprisingly, obtaining profitability was not mentioned often with UK firms. Not one individual in the UK said that this service was profitable. Instead, responses focused on the technology process being so new that no one knows where the ecosystem will align them.

Unanimously, interviewees pointed to lagging technology, poor infrastructure, weak economies and lack of access to financial services as factors leading to the dismal situation in India with respect to financial access. Despite these challenges, respondents noted that key drivers of mobile payment engagement in India included financial inclusion, competitive pressures, profits, economic development, technology and enhancing consumers' quality of life. Interviewees cited competitive pressures, within and across sectors, and financial inclusion, as key drivers for mobile payment engagement in general. Financial inclusion refers to the aspiration to provide access to formal financial services for unbanked and underbanked consumers. Interestingly, only government and telcos cited aspects such as macro-level economic development drivers that strengthen economy and increase gross domestic product (GDP) among the factors compelling their engagement in m-payments in general. Yet, agreement emerged, across categories of actors, regarding the notion that m-payments are indeed another channel for accessing existing payment platforms.

There will continue to be a wave of m-commerce and m-payment systems, yet regulations needs to be simple and painless enough for people and potential customers to even contemplate using this service. A central bank that enables mobile payment systems as well as actor transactions that is adamant on cumbersome procedures for simply opening a bank account is not a progressive regulator.

Fundamentally, it comes across as a failure of the providers who market to and convince customers about the idea of creating storage value from m-money accounts. In India, many m-payment suppliers and providers are more focused on building the idea of a basic m-money platform and agent network whereas in the UK, these firms are focused on increasing their customer numbers, but in both countries there still leaves the challenge of dealing with burdensome regulation and innovation to others. This is not saying that regulation should be dismissed, it is needed, but certain policymakers promote heavy deployments of using actors which are very similar to wallet-based services that can cause an evolutionary path to be inhibited. Thus, it is the actors who become more innovative in mobile based services and not the banks or telcos. The actor network increasingly gets bigger and becomes more geographically diverse.

The ability to pay for products and services is going to be more fragmented in the future where no firm will be a leader, much less, a global leader for this service. The idea of 'once a customer uses the service' does not equate to the customer using the firm who provides the service the rest of their lives. It has become much easier to switch providers, especially when m-payment systems have various aspects of what defines an m-payment. Joint ventures such as Weve in the UK have to rely on collaboration in order to attack the market as a group since the telcos have realized that they cannot do it on their own. However, success depends on market sophistication. The value propositions for end-users in the UK are not attractive enough to use mobile payment systems full stop as compared to customers in India. Lack of adoption could be that the technology for m-payment systems in the UK has to incorporate within the credit and debit card infrastructure.

Majority of the interviewees in India revealed the importance of collaboration and partnerships with other actors. Possibly, the importance is forced since the Indian government dictates who will lead the alliance thru regulatory intervention where it primarily favours the banks. However, not so much in the UK and this is causing a lack of interoperability. Yet, just the same as in India, banks in the UK revealed a negative aspect on the prospect of partnerships with telcos, but not so much with

software or technology firms. Banks in both countries see themselves as the leader of the m-payment initiative whereas telcos gave the impression that they are allowing the banks to believe they are the leaders of the ecosystem. Importance, though, was emphasized on customers and consumer perceptions with regards to who leads the alliance or collaboration. However, generally, the firms emphasized that it will be the customer who will create the momentum and the relationship with these customers will be a main driver of innovation.

For m-payment systems, there are various scenarios for the future of the service in both countries where this is shown in Figure 7.1. The figure depicts future scenarios where some aspects such as ecosystem and consumer adoption were taken from the Task Force for Payments Review (2011). The Task Force for Payments Review (2011) provided a useful framework for predicting the scenarios for the UK and India. Both countries have fragmented ecosystems that have devolved into either moderate amount of consumers or rapid amount of consumers. This makes the firms in the system either tech shifters or technology laggards. However, once there is better alignment in the ecosystem, this should increase consumer adoption where firms will be either satisfied adopters or actually become global leaders. The market calls for innovative offerings that cater to local needs and conditions, so there is no single model that will work in all markets. Nor is there a "one size fits all" model that can work across all developed countries or all developing countries. On the technology side, there is a need to establish an architecture that is open and flexible, and that can accept many different services in an evolving context of contents, data, applications and business models. This architecture must be flexible, based on service-oriented architecture, include security at all possible levels, and ensure performance. It must not be a rigid framework; rather, a modular and adaptive construct with multiple dimensions embracing the network layers, APIs, the central IT layers, the end-user devices and the end-user applications and content; where HTML5 is moving in that direction.

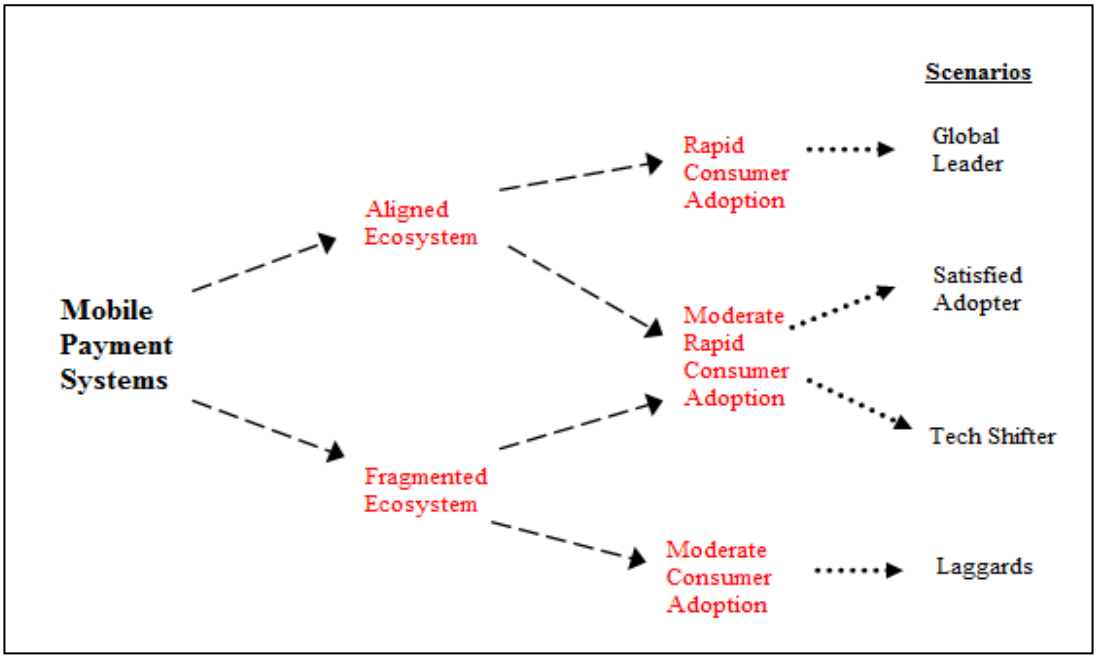

Figure 7.1 M-Payment Systems Future
Source: Adapted from Task Force for Payments Review (2011)

In terms of innovations, there is potential for some of these firms to become global leaders, technology shifters, satisfied adopters or laggards. The UK's regulatory environment is enabling m-finance market entry, ICT infrastructure that is rolling out 4G, and the availability of m-wallets and NFC for nomadic micro-payments all suggest a highly innovative environment; where given the internationalisation of its banks and telcos could aspire to global leadership. However, it is worth noting that all countries are protective of the banking system and may be techno-nationalistic (Ostry and Nelson 1995), since control is important to economic development and stability. Thus, would it be conceivable for Barclays to become the dominant m-payment provider in the US, China or, possibly Africa. The answer would be 'no.' Furthermore, such a scenario presumes that bank(s) and telco(s) jointly venture internationalisation, when the evidence is that they cannot cooperate effectively at a national level. Far more likely, is the internationalisation of back-office m-finance systems, perhaps emulating, and sourced from the Indian firms successfully manipulating data and providing telco services in India. Given low penetration of 4G and 3G in developing economies, technology-shifter appropriate or intermediate technologies may be successfully internationalise than m-digital wallets and NFC, at least in the short-term. Changes in retail payments can be triggered by factors such as

the emergence of new payment schemes and non-banks broadening their scope, and finally, regulatory changes. On a global level, technology will lead to more convergence where significant differences between countries and regions will persist with variations.

There are other players such as technology firms who are entering into m-payments; long term threats for banks. However, banks in the UK are still of the mindset that for consumers, and from the consumer perspective the banking and financial relationship is with the bank. Therefore, customizing the banking requirements towards this segment requires a huge amount of last mile breach and understanding of infrastructure, and banks find this a challenge to address. For bankers, in general, it is easier to handle few customers with high transactions which make sense commercially. For the poor, rural segment, it comes down to big volumes, small ticket transactions. The nature of the product requirements requires a huge amount of cost and firms need justification for these costs.

India has many advantages to become a global leader, especially over the past few decades with IT global leading technologies. Yet, the country has been dealing with more disadvantages. For example the infrastructure, heavy regulation and dominant control of the telecom sector by only a number of firms decreases the innovation process as well as preventing India from becoming a global, dominant player in the m-payment sector. In essence, it has been creating false dawns with all their technology knowledge and learning happening that the right business model with the right service can make the difference. However, with cheap smart phones and fast wireless network increasing in usage and availability, India can become a leader depending on how the regulation is structured for the sector.

Hurdles for m-payment systems in both countries seemed to be in agreement with the regulatory environment. Absence of industry standards was also a common hurdle for the two countries. Since India places more emphasize on the regulatory framework, it seems that banks and their unparalleled nature of partnerships more specifically with telcos hampered their engagement in the sector. Telcos in India,

vice-versa, pinpointed partnership issues with banks as a hindrance. The software firms or the technology providers did not seem to see partnerships as a hindrance from their perspective, but as opportunities because collaborations are at a point of convergence. However, all the firms were in agreement that the need to engage in targeted technical assistance and training efforts for consumers is a problem for not just a developing country, but also developed country as well.

7.6 Conclusion

Even so, the pace of mobile payment engagement has been comparatively slow as compared to the overall proliferation of wireless technology, and mobile commerce innovations, across the globe. Therefore, an exploratory examination of m-payment segment yielded useful and insightful information regarding key considerations and factors influencing organizations' engagement in mobile payments. Moreover, thoughtful inquiry into interactions and relationships between actors within inter-organizational alliances deepened the researcher's understanding of critical success factors and impediments related to m-payment alliances. Finally, the current research shed light on crucial considerations of regulatory enablement, assessment of economic opportunity and maturity of banking and telecommunication infrastructures within mobile payment systems.

There are factors identified that contribute to the success of the m-payment systems in the two countries. These factors include variety in early process; establishment of m-payment systems; employment of policies for the service; the use of financial and telco policy to favour the sector. M-banking and m-payments in the UK and India use the same techniques, but the service has developed along different trajectories. However, in the two countries, opposed approaches have been taken to regulate the same service. India has come to the conclusion that they need to protect consumers and merchants with an additional aspect to the overall service ecosystem. As a result, the government has imposed more regulation on the process as compared to the UK.

Data revealed that many emerging markets dictate who will lead the mobile payment alliance through regulatory intervention, primarily favouring banks. As such, in

many markets, only banks can obtain licenses to lead mobile payment initiatives. However, respondents revealed the importance of consumer perceptions with respect to who leads the mobile payment alliance within other market contexts. In the absence of regulatory stipulations, there is a general consensus that the customer will create the momentum, and the mobile payment initiative will be driven by the firm with the existing customer relationship or the strongest brand.

Undoubtedly, the utility of m-payment technology is immeasurable in emerging markets and in other geographic areas plagued by poor infrastructure and the lack of access to traditional banking. Mobile technology proliferation is creating first-time access to financial markets and relevant information for many consumers and suppliers in remote parts of the world. Insights from literature coupled with findings from semi-structured interviews reveal the need for organizations to design innovative mobile payment inter-organizational alliances by identifying and selecting partners who effectively and efficiently operate within the emerging mobile payments business landscape, while adding value to the overall inter-organizational alliance configuration.

This chapter offered a detailed discussion and analysis from the two empirical chapters, Chapter Five and Chapter Six, in order to answer both the research questions. The concept of ideas space was applied to the SSI m-payment sector of both the UK and India where a comparative analysis was discussed in more detail. The analysis focused on service innovation and how the drivers of innovation develop the innovation process. The next chapter, Chapter Eight, will present the conclusion chapter of this dissertation.

Chapter Eight: Conclusion

8.1 Introduction

This is the final chapter of the dissertation and summarizes the overall results of the research in relation to its aims. As shown throughout, this research focused on comparing m-payment systems using SSI and service innovation as frameworks between a developed country, the UK, and a developing country, India. The dissertation answered fundamental research questions of 'how' and 'why' certain innovation processes are further along than others because of firms specific resources and capabilities.

One of the objectives of this research was to better understand the mechanisms, strengths and weaknesses of the UK and Indian M-Payment SSI. The innovation system is modelled as a system of organizations and institutions that deploys resources and structures of knowledge and capabilities to produce new knowledge and capabilities that then drives the process of innovation or new value creation. A sectoral system perspective pays attention to knowledge and its structure as a key element in the system. Moreover, it focuses on key aspects of firms such as learning processes, competences, behaviour and organization. It gives importance to links and complementarities at the input and demand levels as well as placing emphasis on the role of non-firm organizations or institutions.

Finally, sectoral pays attention to the relationships among agents or actors. This is something that cannot have a specific focus if the research had utilized NSI as a framework. This research focused on a specific service in a specific sector of two countries. SSI approach adopts a certain technology as their system boundary. Additionally, technology is provoking a major change in business models and in how financial firms operate. A number of firms from outside the financial service sector are developing new services for m-payment systems. As services expand globally, understanding the way new services are developed in different countries is becoming increasingly relevant.

This chapter is divided into five sections. The first section gives an overview of all the chapters for this research. The second section summarizes the research in terms of the research methods and design, the SSI, service innovation and m-payment systems. The third section focuses on the research implications and offers discussion on the theoretical, empirical and policy implications. The fourth section presents the validity and reliability of the findings while also discussing limitations to the research. Finally, the fifth section discusses aspects of future research.

8.2 Overview of the Research Chapters

Chapter One introduced the general background of the research being SSI systems and service innovation in the context of m-payment systems. It offered a definitional foundation of various terms as well describing the chosen countries for comparative analysis. Additionally, expected research results and contributions were considered. **Chapter Two** was the first of two literature review chapters where it discussed the existing literature on innovation systems and business models while introducing the concept ideas space. **Chapter Three** was the second literature review chapter where innovation in services and previous research in m-payment systems were presented. Specifically, literature in m-payment systems was reviewed in developed and developing countries in order to signify the gaps in literature. The dissertation's theoretical framework (RBV and KBV) was introduced and reviewed. Finally, the research gaps were presented. **Chapter Four** presented the research methodology. Firstly, the chapter discussed the choices of research paradigms and justified why the social construction, or interpretism, and inductive perspective were chosen as the foundation. The research methods and research design were explained including the adoption of multiple case studies as a research strategy for thematic and in-case analysis. Detailed information about the fieldwork was given in regards of the firms interviewed, the methods of data collection, data capturing and data deduction techniques. Finally, the chapter examined the validity, reliability and limitations of the research. **Chapter Five** was the first of two empirical chapters. This chapter presented the data in terms of the first research question relating to SSI m-payment systems in the UK and India as well as business models being utilized. **Chapter Six** was the second of the two empirical chapters that presented data relating to the

research question on service innovation and the innovation process. Thirteen case studies were examined categorized via the drivers of innovation. **Chapter Seven** was the discussion and analysis chapter. It explored the answers to the research questions. Research findings were triangulated to existing literature and insights of the research were revealed.

8.3 Research Summary

The analytical framework was designed from a firm-level perspective. The literature review as a whole identified a number of gaps with regards to the existing knowledge of SSI systems and service innovation. Therefore, questions were developed regarding m-payment systems in comparing a developed country with an emerging economy. The research was designed to answer two critical questions about the sectoral system of innovation and innovation in services. Thus, the research questions were: *1) how does a diverse sectoral system of innovation shape business models within the mobile payment systems?* 2) *why and to what extent do the processes of service innovation differ between m-payment systems as explained in the UK and India?*

Purposely, this research focused on an often ignored emerging economy context with regards to SSI and service innovation because previous studies are, commonly, more central to being designed in developed countries. Research outcomes revealed that innovations in m-payment systems in India demonstrates many characteristics similar to m-payment systems in the UK; specifically the incremental nature of innovation (Hirsche-Kreinsen, 2008). This gives greater credence to existing theories and perspectives on m-payment systems by demonstrating their wider applicability to a developing country as well as to a developed country context.

8.3.1 Research Methods and Design Summary

Chapter Four explained the research methods for the qualitative study in using thematic and in-case analysis. The holistic issues and outcomes of the research are not evident in the positivist research, thus the interpretism perspective deemed to be stronger. While taking influence from social constructionism, the research offered a

unique and comparative perspective on SSI and service innovation. In order to provide a deeper understanding, m-payment systems have been investigated in terms of its underlying structure or as objects within objects. Other components of interpretism include the conceptualized factors influencing the innovation, causal powers that can lead to innovation, and contingent relations among objects or conceptualized as a structure of SSI and services. Case studies were utilized because they deliver empirical and rich descriptions of specific phenomena in real-life context. Overall, the research was inductive and exploratory which resulted in obtaining significant insights for SSI and the innovation process of m-payment systems.

8.3.2 Sectoral System of Innovation

The literature on innovation systems recognize that each component may be influenced by the system's boundaries or scope such as the sectoral. This notion of sectoral system places emphasis on the structure of the system in terms of products, agents, knowledge and technologies and on its dynamics and transformation. In broader terms, one could say that a sectoral system is a collective emergent outcome of the interaction and co-evolution of its various elements. Furthermore, Altenburg (2009) found that the characteristics of innovation systems in developed countries may not reflect those within developing countries. Although, a study by Archibugi and Pianta (1992) has suggested that most developed or advanced countries show different technological specializations, and become more knowledge intensive showcasing different national strengths and weaknesses in science and technology which will emerge overtime. This can be applied on a sectoral understanding since knowledge is a core aspect of the system. However, most SSI research has focused on developed countries (Malerba, 2009). Nevertheless, in doing a comparative study between a developed and developing country, there are identifiably gaps to understand for a developing country's innovation system. These gaps include lack of understanding of possible emerging technologies in country context and lack of understanding of innovation that reduces poverty.

The research focused on SSI because of the patterns of innovation and high competition of m-payment systems. SSI research often defines the specific problems that firms have and how these problems affects the dynamics of the evolving sector. The notion of SSI considers detailed features of technology as well as the market environment. SSI helps in breaking down what firms are doing in the innovation process as well as their strategy in providing the service in both the UK and India respectively.

8.3.3 Service Innovation

Despite the growing body of service related research, there continues to be a call for more research on service innovation because many current studies do not fully capture the complexities of service innovation (Ordanini and Parasuraman, 2011). Part of the reason for this is that the innovation literature predominantly focuses on tangible products and treats services merely as a special category of products. Also, from a global marketing perspective, this study focuses explicitly on the cross-national differences in NSD between developed and developing countries. In doing so, it responds to the call for more cross-national studies of developed and developing countries because the information obtained in developed countries may not be relevant for developing economies, especially those in Asia (Iyer et al., 2006; Zhang et al., 2008).

For banks, though, the question is no longer whether mobile banking and payments will be important and sustainable because they are innovative for all aspects of m-financial services. To reap these opportunities banks will have to overcome both internal and external challenges, noting though that the bigger obstacles such as the development of standards, the roll out of technologies, the adoption of services, how to work with new and emerging value chain partners, how to endorse new revenue sharing models that properly acknowledge each player's role in delivering mobile services are systemic, and thus largely beyond the control of banks or financial service firms individually. Furthermore, the road to any m-services in the UK is fraught with risk as a combination of nascent technologies, unproven demand, fractured approaches, and the lack of standards and networks more so than in India.

8.3.4 Mobile Payment Systems

For almost the last decade, m-payments have generated a lot of hype, but although there were early adopters, not all the supportive infrastructure and ecosystem relationships were in place to establish success in the marketplace. Currently, m-payments are advancing steadily while maturing to a level that is shedding the wild visions of applicability, and becoming a practical alternative for a payment infrastructure.

The study sees technology as both an enabler and a barrier, owing to the many competing technologies and localized standards as a sign of the distance separating firms from a truly global market. The study distinguishes mobile banking technologies (SMS text, mobile browser, custom applications) from mobile payments technologies (NFC companion devices, embedded NFC, SMS text, and voice). All have one or several uses, and their respective pros and cons. Admittedly, NFC is capturing a lot of attention nowadays, it is however hampered from wide-spread adoption by a number of critical and massive challenges, such as the necessary update to merchant networks, and the fact that there are a number of competing methods to enable NFC payments, each with its own unique challenges and considerations for banks.

In developed markets the emphasis must be on speed of transaction, convenience and value, as the vast majority of people have accounts where basic services like direct debits and standing orders already operate to the satisfaction to the customer. It is a different proposition when considering developing countries. The main distinction comes from how developing countries stack up in terms of existing private banking framework. Mobile remote payment has huge potential in markets where this infrastructure is scarce, as it enables two parties to send and receive payments or exchange funds using the mobile channel, irrespective of where they are located. This allows the transfer of funds or payment of a bill with nothing but a mobile handset and the payee's payment reference / phone number. The payment received from any such transaction can then be redeemed as airtime, goods or cash at selected

merchants. The size and population density of these markets make them a very attractive proposition for m-financial stakeholders.

8.4 Research Implications

Contributions to innovation literature stem from a variety of academic disciplines where different researchers tend to emphasise what they consider the most important elements of system of innovation and service innovation. The research addressed the lack of an all-encompassing and exhaustive perspective of m-payment systems. By incorporating the conceptual and theoretical aspects of system of innovation particularly the variant of SSI with empirical evidence, this research enhanced the understanding of SSI beyond a mere conceptual approach as well as provides new perspectives to the approach.

Despite being similar in many aspects, there are significant differences between the UK and India. They embody contrasting characteristics in terms of their socio-economic and cultural background. The UK represents a populated, developed economy with an occidental cultural heritage; whereas India typifies a populous, emerging economy with an Asian cultural heritage. Consequently, though, there are several differences between the UK and Indian service sector. For instance, the UK financial service sector is mature and dominated by large global players. Additionally, like many other developed countries, the UK has gone through a process of deregulating and privatizing the financial service sector. On the other hand, India has only recently emerged as a country of immense industrial power that is actively pursuing policies of economic liberalization and privatization (Ramamurti and Kapur, 2001).

A fundamental problem identified in the UK is the lack of strong innovative specific institutions, specifically the regulative institutions for m-payment systems as a whole. While in India, poorly managed implementation of some of the regulative institutions has led to strengthening of cognitive institutions amongst firms as a consequent of regulation that includes a sense of disadvantage, helplessness and exploitation, and lastly, distrust of the government.

Firms will continue to look externally for knowledge which will enhance innovation and competitive advantage as well as increase strategic partnerships. Results in the UK have shown that certain firms are creating groups of alliances which involve more than two firms such as Weve; whereas in India, firms are forming individual alliances with other firms. Group alliances are more likely to involve communication across multiple partners and joint ventures with shared control, but it might also constrain the firms involved. Such constrains are likely to detract from innovation.

8.4.1 Theoretical Contributions

There are a number of theoretical contributions to consider. These considerations include the advancing the understanding of sectoral systems of innovation and service innovation to a developing country context. The research helps to show how m-payment systems vary and in particular what the drivers of innovation are between a developed and developing country context.

One of the main contributions is the usage of ideas space as part of the SSI system. Table 2.1 was developed and applied as an analytical framework to Figure 2.3. This framework emphasized the key parameters of the M-Payment SSI between the UK and India to create Table 7.1 and Table 7.2. This m-payment SSI framework is constructed that is usable by policy-makers, analysts and firms exploring their value chain positioning.

The research emphasises the importance of integrating firms' activity (including new product and service design) into integrated service systems since the particular nature of these systems for m-payments varies between contexts. For instance, demand-drive innovation influences the way products are manufactured to fit consumer needs. In order for innovative products that fulfil consumers demand to be successful, tight user-producer relationships must be established throughout the development process. Failures to form successful user-producer relationships may mean that developed products are not suitable or that end-users are not receptive to using them. Thus, there is reason to believe that India could be successful in creating a new service development at a lower price than the UK; especially within the business

correspondent business model. Thus, existing theory needs to take into consideration the possibility that emerging market firms are perhaps more innovative than developed countries, and as a consequence, future research should address this with caution.

From a theoretical perspective, existing research on innovation systems have all tried to clarify the system by composing definitions in order to form a general framework. Previous literature, though, treats innovation systems as being isolated from other concepts besides technology transfer of the firm to lead to technological capability accumulation. Researches from developed countries have shown that an organized system provides a good habitat for the effective accumulation of technological capabilities and innovation (Malerba, 2004; Nelson, 1993). Although valid for some developing countries (Kim, 1999; Hobday, 1995), it can be elaborated. Innovation systems, overall, base their foundations on a broad set-up of a system where governments hold key roles for determining the policies for the industrial or sectoral structure. These policies would aim at increasing interactions among the partners of the system.

8.4.2 Empirical Contributions

In regards of empirical contributions, this research as shown that there is not a complete model in explaining the performance of firm level innovation. Progress has been made in analysing individual actors and their relationships; if one takes a systematic stance it is clear that there are still aspects that need to be examined within a single approach. Although theoretically, SSI concept combines parts under a single umbrella, there are still very few attempts to be made to empirically test for the determinants of firm level innovation in a holistic approach. Even more so, there still lacks aspects from a developing country.

This research supports McGrath's (2010) discovery approach to business models: in context and with available technologies and cultural predispositions towards service products, business models will emerge and evolve. All models are provisional since technologies, market opportunities and (in m-finance) regulations are dynamic.

Indeed, this research supports Amit and Zott's (2001) that the greatest danger facing business models in lock-in when the market and technology environment has moved on. A contribution of this research is to re-emphasise the importance of regulation and culture in creating successful business models. The Indian social innovation models enfranchising the unbanked have been successful only because institutional pressures obliged banks and telcos to cooperate with socially entrepreneurial organisations. While these have created sustainable business models as seen in Kenya's mPESA, in the UK, the drive to reduce costs and improve access (m-wallets and NFCs) in an open SSI, has resulted in lack of m-finance standards that inhibit cross-system business models.

The approach to SSI developed in this research emphasises the firms and knowledge flows in Ogle's (2008) ideas space rejecting the use of SSIs as descriptive, lifeless and deterministic. This aligns closely with Chesbrough's (2006) ideas on open innovation. In this case, the framework shows that government heavily influences the Indian SSI, which from the viewpoint of social justice shapes innovations towards goals that are socially profound. A more open, at times almost too open, market-driven UK SSI is innovative in both product and process, however, has not yet been able to create SSI-wide standards necessary for the wider interoperability enhancing customer usability. It remains unclear whether the UK SSI will 'close' somewhat to support industry-wide standards or continue in a fragmented manner with cost-downs as a major driver. The answer lies in the preparedness of banks and telcos to joint-venture and/or the ability of disrupters to impose a dominant logic.

As Chakravorti and Lubasi's (2006) work on pre-paid cards illustrates, leveraging complementarily from existing social networks greatly increases the success of an m-finance innovation. This is precisely what Eko and Induslnd Bank have done in India; in effect the smartness is in the network, not the advanced nature of the technology, which may be mature. UK actors (Barclays, RBS, NFCs, m-wallets) are successfully exploiting their own networks, but not wider networks and are incapable of creating an industry standard. To that extent, although the UK SSI is creating more product and process innovation than the Indian SSI, the latter is more

innovative in creating widely accepted standards as a platform from which to build future innovation.

8.4.3 Management Practice and Policy Implications

Implication for m-payments in many countries are far-reaching and evolutionary as such applications can be described as being almost disruptive innovations because their effects are life altering where changes in the way consumers go about their daily routines are increasing. For practitioners, the research is organized based on a set of factors. Practitioners should direct innovation and technological development towards creating better interoperability with users and merchants. Furthermore, findings indicate in which the business models of m-payment systems will need to evolve from limited proprietary solutions towards cooperation and standardized solutions in order for firms to succeed and become global players.

This research has found that the relationship between innovation and regulation is both complex and dynamic. As new technologies, products and business models develop, new markets and market failures may emerge requiring changes to the existing regulatory framework. The research notably finds that the impact of regulation on innovation is influenced by the way in which new proposals are designed, implemented and enforced. Evidence shows that policy makers and regulators are more likely to support innovation, or avoid hampering it. Yet, they provide businesses with some flexibility as to how desired policy outcomes are delivered, clearly inform businesses about future changes in the regulatory framework well in advance, specify desired outcomes which cannot be easily achieved using existing technologies and business practices, stipulate clear requirements, reducing the possibility of misinterpretation, impose minimum compliance costs, and complement other government market-based and regulatory-based policies that promote innovation. A consensus view in literature concerning the role of governments is that they need to provide the economic and legal institutional framework for businesses. For example, in the context of emerging economies, emphasis is placed on government responsibility where institutional conditions either enable or hinder entrepreneurship (Smallbone and Welter, 2006),

and the regulatory protection of vulnerable consumers (Karnani, 2010). However, government intervention should not duplicate nor crowd out firms, but offer a balance in both countries.

In regards of the relationship between regulation and innovation, this relationship is ambiguous when it comes to such issues as competition. Pro-competitive regulation that prohibits anti-competitive behaviour encourages innovation by reducing barriers to entry for new, more innovative firms, and by allowing firms to choose more freely the strategy and business model which best facilitates innovation. Yet, the same regulation may restrict innovation by preventing businesses from collaborating closely at the R&D stages, preventing certain organizational structures or the forming of some agreements which could facilitate the transfer of knowledge and technologies.

Without doubt, the utility of the SSI for m-payments is immeasurable in India that is plagued by poor infrastructure and the lack of access to traditional banking. For India, mobile technology proliferation is creating first-time access to financial markets especially in remote parts of the world. Insights from literature as well as findings from semi-structured interviews reveal the need for firms to design inter-organizational alliances where knowledge and capabilities can be exchanged.

There are several important repercussions for how innovation in developing countries is perceived. It is unknown to the extent to which the innovation processes discussed here apply to other high-tech fields and more research on the process of innovation in other emerging sectors as well as further exploration of innovation in developing countries is needed to expand alternative models to those currently in the literature. For service innovation, though, the simplistic model of innovation in developing countries, as a process of firm-lead technological transfer and amelioration, fails to fully capture what is actually happening in practice. Thus, one can conclude instead that innovation in emerging fields that have yet to reach their technological maturity is just as strong in developing countries as compared to

developed countries. Furthermore, innovation happens in developing countries through processes that are more complex than originally conceptualized.

8.5 Validity and Reliability of the Findings

As been discussed in previous research, many have noted the threats to validity and reliability in qualitative research (Miles and Huberman, 1994; Silverman, 2001). Validity reflects the extent that a researcher's account accurately represents the social phenomena that it seeks to describe and explain (Hammersley, 1992). Whereas reliability reflects on the transparency in how meaning is drawn from the raw data (Easterby-Smith et al, 2002). Thus, in order to ensure validity and reliability, multiple case studies were adopted that allowed not only for greater representation of the phenomena being researched, but also across cases.

The majority of data was collected during interviews with additional data acquired through memos and other archival records in order to ensure data triangulation. Specifically, data was obtained and collected through semi-structured interviews with key informants from various industries and firms in both countries. Data was deducted through cross-tabulation analysis in order to explore the relationships between the actors and agents of m-payments.

8.5.1 Limitations

Like any other research, there are limitations that need to be acknowledged. The main limitation relates to the qualitative approach. A major issue in doing solely qualitative research is that there is little basis for scientific generalisation that case studies provide. Also, replicability of the data results cannot be achieved as easily qualitatively. Thus, the research tried to overcome this issue by adapting multiple case studies in the attempt to obtain analytical generalisation.

The research was limited to firms that were associated within one sector, but it covered more than a couple of industries. The general aspects of the findings was not the main goal of this research; however, there is value in knowing if the findings of this research would be similar to the full breadth of firms in the mobile payment

industry. The qualitative research relied on data collected from interviews and documental data from a limited population. As a consequence, the findings may not be representative of the m-payment or m-financial systems as a whole, although the firms interviewed were diverse. In addition, not all segments of the sector were adequately represented in both countries.

In having the resource-base view underpin the theoretical approach, it offers some limitations. As such, the main limitation of RBV is its inability to fulfil the requirements of a theory, yet, this does not detract from the fact that it provides a framework which can better explain the differential performance of firms than traditional structural approaches. There is a growing theoretical interest in RBV because its empirical application is testimony to the increased important of resource-based explanations of competitive advantage where it is essentially complementary to other theoretical perspectives. Although Porter (1985) focuses on the industry structure and market positioning to explain competitive advantage, RBV offers a different argument in that a firm's resources and capabilities contribute to the firm gaining advantage in product activities and market positioning. RBV is not considered to be a new theory of the firm. One major criticism of RBV is that it does not satisfy the condition of a theory to be classified as such as well as it does not fulfil the ability to make some scientific generalisations (Priem and Butler, 2001).

From the interpretist perspective, it was difficult to determine whether the metaphysical ontology of this innovative service is the actual truth or not. Yet, influence was still drawn from Sayer (1992) who suggests that while there is an external reality independent of the human mind, there is also resistance to it. Instead interpretists should focus on the epistemic gain about truth no matter how many limitations the research may have, and not to worry about the absolute truth.

Data collection mainly involved 27 semi-structured interviews with insiders, managers and users within the m-payment ecosystem. In order to provide greater richness to the research, more data could have been collected, but financial limitations, limited resources and time constraints coupled with high levels of risks

associated with certain regions were major restrictions. Consequently, maximum caution was exercised in order to limit travel in both countries as well as contact a practical, feasible number of respondents. Due to time constraints associated with academic, doctoral research, this research was in essence, cross-sectional in nature. A longitudinal research can be carried out in the future in order to capture the transformational and evolutionary aspect of SSI as well as service innovation.

8.6 Future Research

There are opportunities for further research that has not been fully explored. In regards of technology, the rate of change is so rapid that it becomes difficult to make predictions that are likely to overwhelm the ecosystem, or create unsuspected technological innovations for the sector. In terms of having a standard system, consolidation will have a critical role in how the next generations of these systems grow. In fact, standards are already encompassing a broadly-accepted standard and will continue to become larger as consumers accept the service more. The adoption of these services are surpassing the usage of credit cards and becoming a future means of choice for consumers.

For m-payment systems, the two most researched factors are mobile payment technologies and consumer perspective of mobile payments. For the technological basis, though, it is only fragmentarily covered. There have been studies focused on the social and cultural factors impacting m-payments and disruptions of traditional payment services. For this research, though, most of the themes discussed and used in the framework are exploratory. Indeed, the research is an early phase for possibly more rigorous and detailed research projects to provide deeper insights. A critical theme to further investigate is the optimal portfolio of value-added services and data mining. Still there is confusion about the relationships between m-payments, e-payments, traditional payments and banking services are unclear.

M-payment systems in a developing country demonstrates many characteristics similar to m-payment systems in developed countries, but it is important to avoid generalizations as the particular sectoral context that firms need to be investigated in

order to understand the complexity of this particular aspect of innovation. Without drawing to attention the contextual details, any policy or institutions initiatives to encourage possibly collaborative firms or entrepreneurial firms to innovate are likely to fail. M-payment systems in both countries are linked to a complex interplay of multiple sectoral elements in the form of interactions between or among these firms or actors.

This research solely consisted of qualitative examination in advancing the understanding of m-payment systems by firms in two specific countries: the UK and India. Given the absence of related insights in literature concerning developed and developing countries, moreover, this subject matter is worthy of further exploration. Further examination should apply both Table 2.1 and Figure 2.3 to another developed or developing country in the context of SSI. Thus, one would be able to apply the similarities and dissimilarities in other comparative researches. Also, additional exploration can consist of examining the phenomenon using quantitative research methods to provide greater insights into all the actors involved. In addition, it could give an in-depth analysis of alliances and forced collaborations that can enhance understanding of these configurations and interactions.

The anticipation of the results of this dissertation is to submit three journals for publication. The first journal will focus on the nature of M-payment SSI systems offering a comparative analysis of a developed and developing country. The target journal will be Research Policy and will be titled "Comparative Analysis of the United Kingdom's M-Payment SSI to India's M-Payment SSI." The second journal will focus on comparing m-payment SSI systems between two emerging economies, specifically China and India. The target journal will be Research Policy and will be titled "Innovation Drivers and Trajectories in M-Payments: India and China." Finally, the third journal submission will relate to service innovation and knowledge flows in m-payment systems in India with a target journal being the Journal of International Business Studies. This journal will be titled "Service Innovation from Knowledge Flows in the Indian M-Payment Industry."

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Appendix A: Case Study Interviews

Interview 1: National Payments Corporation of India (NPCI), Head-Mobile Payments and Financial Inclusion Manager, June 26, 2012

Interview 2: Atom Technologies, CEO and Director of Financial Technologies, June 19, 2012

Interview 3: Royal Bank of Scotland, Head of Mobility, July 10, 2012

Interview 4: Eko, Chief Marketing Officer, July 16, 2012

Interview 5: Mahindra Comviva, Head of Mobile Financial Solutions, September 6, 2012

Interview 6: Induslnd Bank, Chief Manager of Inclusive Banking Department, September 28, 2012

Interview 7: Lloyds Bank, Manager of Emerging Technologies, Customers Brands Digital and Telephone Banking, October 9, 2012

Interview 8: Idea Cellular, Deputy General Manager of mBanking/mPayments

Interview 9: Barclays Bank, Vice-President of Corporate Payments, July 16, 2012

Interview 10: TIBCO, Senior Software Engineer, October 10, 2012

Interview 11: Monitise, Group Strategy Director, November 7, 2012

Interview 12: iKaaz, CEO, December 5, 2012

Interview 13: Beam, Chairman, December 7, 2012

Appendix B: Drivers of Innovation Tablet

Firm	India – National Payments Corporation of India (NPCI)
Regulation	provides regulation and switching; India regulation very forward looking but willing to experiment to secure and cost effective; m-banking guided by guidelines of RBI
Innovation/Technology	phone to sender bank to IMPS to receiver bank; does not matter the technology of the phone; both telco and bank are working well; certain standard w/ connection to information highway; created high-tech private ecosystem compared to other countries balance w/ bank/telco
Service	Launched an instant remittance solution as mobile based person to person (P2P); multi-channel, multi-dimensional; IMPS platform for P2P & P2M; works with 43 banks in the ecosystem. Create National Unified USSD Platform channel (NUUP) to leverage USSD channel with NPCI connect to all Telcos for m-bank and m-payment services; more secure than SMS channel; for m-banking: mobile number and PIN but have to register account; more transactions on m-banking since application issues with downloading app and configuring app on phone
Customers	USSD based mobile transactions for financial inclusion carried out universally on all telco network; menu based no software uses PIN to avoid SMS; population of 2k in town, then banks have to provide branch
Theme	SMS, USSD, GPRS; mainly SMS base; m-banking cost effective, 24 hour service; the application is "living debt"
Players	BCs coming on slowly; for people without bank accounts Telcos are providing wallets
Process	standard micro GM instrument given to bank customer with three options, it is a card and pin; a card with biometric ID called card hand; NPCI has created USB platform for all telcos and banks to talk to each other; gives out sort code to bank customers with dial number (mainly for financial inclusive); can also do small value payment merchant transactions
Other	No NFC future; telcos are connected to the bank in seamless connection for wallet for people without accounts; 298m customers w/ 600m people w/ phones 29% smartphone; adding pre-paid card issue again; banking not strong in Africa; India has strong interoperability

Firm	India -- Atom Technologies
Regulation	mobile banking perspective regulation makes a difference but normal mobile payments there is no regulation; in terms of limits no specific watchdog for technology they use instead driven by security channels and watching out what is being used by other channels
Innovation/Technology	forum for creating a payment equal system across different channels that is connected to mobile; mobile pay in system & mobile banking application targeted at banks (white label application for banks)
Service	payment processing company; provides mobile payment solutions (one branded product); mobile banking solutions for banks
Customers	Person has to have a bank account for m-banking but not for m-payment; challenge is to get bank customers to do transactions on mobile banking application; people use it for balance enquiries & mobile recharges
Theme	four technologies for mobile application; very cost effective from the initial stake
Players	middle man between telcos and banks
Process	mobile payment between banks and Visa or wallet to shop with merchants that have system; link banks from customer account to other banks (fund transfer); use mobile for pre-payments, P2P & money transfers (makes direct cost lower compared to other channel)
Other	Constantly innovating on application side for features and various kinds of technology to be used within the application; developing a technology within the application itself (transit side developing); competes with NGPAY/Wataniya

Firm	UK -- Royal Bank of Scotland
Regulation	strict regulations on cash payments of max amounts
Innovation/Technology	bank perspective: a wallet transfers small amounts of money from the big safe to the merchant; wallet and other payment systems are all the same in guaranteeing that they will pay a merchant overall still comes from the bank; bank is focusing more on NFC and not on wallet
Service	banks hold money where its common means of exchanging value; through time other means have developed and evolved of getting money from banks to merchants or other persons; Visa/MasterCard are guaranteeing money instead of having cash in wallet; person uses plastic to pay merchant by entering in pin then merchant gets paid and merchant pays for that privilege = payment services but still money to pay for all this comes from the banks; m-banking is complimentary service of how bank communicates with its customers
Customers	does not focus on customers who are in the black economy (cash economy) since poorly educated in money management; responsibility is on govt
Theme	"branch in (your) pocket"; m-banking changes the paradigm of the entire payments system; NFC will be game changer for payments system and could knock out players trying to get access
Players	competing with O2, PayPal, Google for the wrong fight of "wallet"; partnered with Monitise to gain knowledge of the mobile market for bank to bank (uses their security model)
Process	m-banking evolved from e-banking; access website of bank in mobile format; NFC transfer cuts the credit card out of the picture since uses secure chip in handset (basically credit card in phone) where do not need to connect to banks back end system like credit cards; banks pay telcos to get access to data on phone; phone companies want control of the SIM and control access to it which leads them to create 'wallet'
Other	depending on mobile or tablet will give you "real estate" to manoeuvre money transfers; non-banks are developing digital wallet but banks perspective is why do you need a wallet; NFC lets you take the change out of the purse with small amounts to be authorized; NFC payment is no different from debit/credit since it comes directly out (credit waits 30 days); does not know if m-banking is cost effective; main challenge is the speed of accuracy (not security etc)

Firm	India -- EKO
Regulation	regulations evolving since 2006 that say bank is allowed to appoint BCs to source business for that bank and for financial services to be delivered to alternate channel (RBI expectation is that there should be savings, remittances, credit and insurance)
Innovation/Technology	financial transactions consist of two parts: exchange of information (cheaper) and exchange of funds (expensive) but make both electronic then does not matter; cost of transaction low when dealing with electronic transfer; basically made the exchange of information cheap when data directing is not available; USSD looks like SMS but hidden bearer works faster like Skype as opposed to 'email'; SMS like email since it goes into a mailbox and gets forwarded to other mailbox; USSD like chat session and is instant; focusing on pre-fund wallets because of trust issues
Service	Eko functions as banking correspondent of State Bank of India, ICICI and YES Bank; largely focuses on savings or on remittances; largely cash in cash out transactions; provides the technology and the business process to do the transfer but not allowed to charge customers only banks can; fee sharing agreement with banks; business model based on collection of fees from customers who value the service for the convenience and ease and speed; principal aspect of the service is electronic money can be converted into cash; business model from the share of fees income as result of customer paying for services
Customers	focusing on the least common denominator behaviour of cell phone users to get a sense of making phone calls not using SMS or data services but USSD technology because of consumer behaviour of illiterate in dialling numbers
Theme	technology is how to talk to existing intermediary banking systems and processes if people have different banks
Players	works collaboratively with banks; telcos starting to compete
Process	appoints neighbourhood stores as agents and train them and equip them with simple mobile phone based technology that talks to the server using GSN where the server infrastructure then talks to banking systems; private lease lines that enables financial transactions to happen across the counter; person walks in pays cash in including fee and agent does the transaction; need to know who the person that is being debited and credited and the amount (financial transaction); think of transaction on single string purely dealing with numbers the 'signature' as OkeKey on RSA device which is like a USB stick with display screen it creates a new six/seven digit number to create one time password generator where you created physical one and paper one; pre-fund wallet where agent appointed puts money into the bank to accept deposits to act like a bank; agent dials a transaction but never debits the account instead credits customer account to de-risk the customer and bank since agent put money up front and simply collecting money back instead getting it from customer instead of bank (refunded cash bank model)
Other	biggest challenge is the movement of cash not connectivity since fraught with risk

Firm	India -- Mahindra Comviva
Regulation	India has never prescribed banks to tie up with telcos but telcos need the bank to provide cash in/out more bank related; Mobile Banking Guidelines focuses on mobile tariff for accessing financial services; Pre-paid instrument criteria regulation; 3 kinds of guidelines
Innovation/Technology	launched first mobile banking application 6-7 years ago thinking everyone would use it but obstacle since apps used were not synonymous with what people wanted; challenge to work with various phones and features; consumers resistant to change and security concerns; needed to find the right processes to make it simple where consumer can adopt which is more important than technology (knowing the consumer)
Service	product/tech product company more telecom focused to provide mobile based solutions to telcos or Mobile Financial Solutions (MFS); full mobile service of mobile banking, mobile payments and mobile money; caters to requirements of stakeholders like bank or telco; looking at the easiest way for a customer to complete a transaction
Customers	for unbanked can you enable idea on idea to enable literacy
Theme	mobile money programme of financial services; for MFS can create a solid ecosystem which creates a core and companies can abstract the layer from the core for in-divisions to be very fast; interoperability science similar to intuition aspect with partnerships with MasterCard; the mobile phone grand piece of technological event in all consumer segments; consumer segments similar to developed world and India highly ranked for being developing market
Players	
Process	pre-paid instrument (open loop prepaid instrument) where you load the money and then you keep consuming it as you go offered only by the bank; pre-paid cards cannot be cashed out to avoid bank regulation; mobile transcends the cost and value disassociation where can you add more revenues to consumers by providing value end services
Other	BCs is an extension of banking network; sees NFC as a technology chasing a business case but from the value proposition but taking integrated approach

Firm	India -- Induslnd Bank
Regulation	RBI is central regulator of banking sector; RBI been directing/mandating banks to reach out to non-bank sector to offer banking solution creates challenge and dilemma; for RBI consumers are not accustomed to m-banking; what RBI expects and the product requirements are different from traditional offerings of banks (customizing the banking requirements requires understanding and infrastructure where banks find challenging to address
Innovation/Technology	
Service	bank focuses on micro finance and financial inclusion function; uses intermediaries who have capacities and expertise to reach out to the non-bank segment; credit offering is traditional but savings is an interim solution with the mobile since requires minimal investment from both customer and bank and intermediary;
Customers	to reach out the poor through an intermediary like Eko; the poor, rural segment consumers have big volumes small ticket transactions
Theme	uses Eko's technology who uses the mobile as a platform; borrowing the technology and solution from Eko; trying to maintain synergies of expertise and product requirements; mobile transactions greater than banking transactions but using smart card technology
Players	appointing micro finance institutions as business partners like Eko
Process	last four years stabilized technology platform where customer already has mobile handset which device and mobile connection then eco platform (lack fast tooth platform) product transactions need data to work with the bank end of banks in order for transactions to be posted; interface solution provided by bank, hardware provided by Nokia but problem with service provider may not be in particular area like telcos, scattered interoperability; for security using smart card technology which costs a lot, but mobile is cheaper; T-mobile connections are security driven in that they issue a booklet of key passwords where customer given booklet digital password, given 3 passwords and has to get booklet from Eko; many processes to be taken care and room for improvement and needs to be addressed in a more and more appropriate manner to protect the consumer from security delivered issues if illiterate to use the digital platform; mobile handsets number driven creates psychological barrier; need to train the frontline who service the customers is a challenge
Other	bankers find it difficult to handle big volumes of small ticket transactions; easier to handle fewer customers and high ticket transactions; great cost to focus on non-bank were matching revenue is not justified yet; m-banking is cost effective but facing problems with mobile alerts using SMS side of things; illiteracy issue and connectivity concern not synchronized

Firm	UK -- Lloyds Bank
Regulation	UK regulation standards
Innovation/Technology	
Service	has digital capability called Galaxy where platform built for Lloyds where manages different processes (coil attachment) of m-banking
Customers	
Theme	m-banking decreases memory for customers
Players	banks have a critical edge over the likes of Paypal since the can hold the deposits
Process	X/Y process; seeing incremental transactions through mobile than online banking and bank can drive more opportunities through mobile (increase data monitoring) to exploit other opportunities; mobile is cheapest channel to service; banks will evolve into new services and propositions for mobile to ID new opportunities and revenue streams by adding value beyond making a payment; loyalty rewards through your mobile; by combining a transaction this leads to new infrastructure requirements since 1 mobile user will = 5 online transactions which creates more burden on the existing infrastructure and mobile hasn't reached saturation point since most banks 20-30%online base; once mobile reaches 50% of usage increase transactions increase management of transactions; new features and new functionality will arise; most banks offer a core set of similar services but banks will evolve and differentiate their services which will create new investment, new innovation and partnerships; a lot of work for banks to replicate services on mobile and innovate and support the new volumes of users they let in
Other	sees m-banking overtaking internet banking; security will always be a concern no matter what; sees strong future in NFC that will work in conjunction with or complement it; NFC great service but practicality is not great (like camera in mobile) to become location for services and used in different applications rather than just payments but becomes issue with sales terminals since expensive overhead for businesses to move to who have to have the terminals

Firm	UK -- MH Invent (Security)
Regulation	cannot provide a consistent security model due to legislation
Innovation/Technology	as application developer to support the device with all the variants, you have to test them all (70% of budget is to test mobile since you can't assume that a UK network will work globally); location awareness will be major factor in communications with lack of standard compliance
Service	focuses on security capabilities for mobile communications; each operators will modify devices (Vodafone, O2 etc) to create their own store on it which creates variants of the Nokia phone (modify plug ware);
Customers	
Theme	hard to put security on mobiles; all reply on a trust model with certificate providers or mutual authorities; Apple Samsung will trust the issues of certificates
Players	telcos were advised to change their encryption algorithms but it's costly to do on 3G networks; in India turned encryption off altogether
Process	invisibility to the user but a lot of banking services tend to be wallet based by topping up your phone or card; too much hopping between wi-fi, 3g, 4g in the nature of communication with different networks and technologies causes confusion in the service for banks; two issues to be address: compatibility and communication and no standardization of security models between networks
Other	NFC is very expensive and fundamentally poor; Barclays Pingit breaks security rules by sending emails saying you have money which creates an impersonation of service; banks will limit transaction values on mobile since they don’t trust it as a valid medium and are trying to apply the desktop principal to mobile

Firm	India -- Idea Cellular
Regulation	banks are favoured by any kind of payment business since governed by RBI; telcos governed by TRAI; telco and bank regulator do not talk that much
Innovation/Technology	m-wallet innovation
Service	mobile payment is using the mobile to make payment; mobile wallet is the custodian place of your money
Customers	Focused on the end-users
Theme	banks are unable to reach millions of potential customers (claim they want to serve); telcos are sitting on millions of folks that they service in a limited manner; telcos want bigger share of the revenue pie which banks are unwilling to share; banks look at telcos as communication provider where telcos do not want to be perceived as commodity provider and instead move up the value chain
Players	Main interaction with customer
Process	Collaboration with bank to be BC and m-wallet provider
Other	

Firm	UK -- Barclays
Regulation	Legally you cannot ask for people's bank account numbers to make a payment and have to do a compliance check of KYC so need to have a complete view of who is making the payment and who is receiving it to avoid money laundry
Innovation/Technology	Pingit application where idea was based on individual usage with lead in proposition which leads into other consumers using it; fast payment transaction but nothing new about the technology, it's hitting the send button which completes a standard banking transaction
Service	M-banking is online banking for your phone; m-payments is when you do not use conventional banking to send/receive funds and use it unconventionally; wallet is account that you receive funds into and pay out and need a bank account to operate through only your smartphone
Customers	at first, mobile payments developed for commercial banking of B2B but now branching out to retail banking consumers
Theme	Pingit was developed in-house and is mobile payment application; it transfers money P2P where each side has to have a Barclays account
Players	current partnerships between banks and telcos are tentative since both are testing the business models; there is no single national commercial success to emulate and hence different models are being tried out; partnerships are non-exclusive which creates power struggles
Process	With Pingit, you have to know their mobile numbers which is used as a proxy for sort code/bank account details. Download the app where you are asked for your sort code and bank account information
Other	No focus on unbanked population; cannot tell if mobile payments will be cost effective since option to go online and nothing changes; more a mind-set about security being a concern but m-payment is more secure than online

Firm	UK -- Tesco Bank
Regulation	Sees regulation as an opportunity to leverage and build very secure and fast transfers since it focuses on customer but often is seen as a negative effect; payment council pushing towards mobile payments
Innovation/Technology	m-banking aspects to look at service component, origination component, transaction component
Service	is not focusing on m-banking but instead application for insurance aspects;
Customers	very customer orientated especially with how loyalty cards interacts
Theme	m-banking is service through your mobile
Players	there is no industry standard for wallet or payments since so many different players and still does not know what consumers are going to adopt
Process	bringing digital world to the physical world; increase of the interaction of the two worlds
Other	the challenge is thinking from the consumer perspective to deliver benefits; looks at the distribution value chain where eventually mobile will have a small concern; it's more about the interaction and relationship where not a problem of cost but the service wanted

Firm	UK -- Tibco Software Limited
Innovation/Technology	m-payments can become the most secure device ever; biggest threat is privacy control since companies will have better tracking of your payments to propose better offers to match your profile; but limits and security of this information should be carefully guarded; biggest challenge of m-payments is often addresses low value payments = low revenues per transaction so for sustainable business model need to process higher volumes of transactions to improve scalability but mainframe systems are not able to address the challenge (improve operational efficiency); the innovation lies in creating simplicity and immediacy of the payment process by not affecting security and creating added value on top of payments (information and data can be correlate with the payment process if you have the right technologies to capture, aggregate and leverage the enormous set of information in the context of real-time interactions)
Service	m-payment is capability to pay with a mobile device; some m-payment service do not integrate with any wallet capabilities (ie on-the-bill-micro-payment solution); you can have wallet solution without any mobile interactions (paypal that uses the internet)
Customers	their customers are telcos, retailers and financial institutions; need to create a mass market large enough so usage becomes natural; need to attract and create value for 2 key actors the merchants and the consumers which finding the right value and right business model is the biggest challenge
Theme	m-payment is still an emerging and un-structured market with small and big players coming in and trying to get a portion of the cake; the market is still immature enough to leave space for new entrants; no one (few countries) has gained a place dominant enough to close the door to competition; the market will naturally defragment with few winners left in each geography
Players	for m-payment service to succeed you need to build up a large acceptance network big enough for customers to join; for future some tech companies will probably position to propose new sorts of financial services with application developers stimulate innovation
Process	a software vendor where software integrates on the service-side to process rules and transactions across multiple channels and payments, rewards and loyalty instruments; have a channel-agnostic platform but the more the device technology is advanced the more compelling service can provide which will impact on the richness of the service; being in the back-end of things as software vendor the challenge is for banks the debate of build vs. buy
Other	the future in wallet will have more integration of mobile has a key channel; compatibility not a big concern but more de-facto interoperability will emerge as the market becomes more structured; not everyone will have 4G or be deployed where at some point it is important to have services that can adapt the level of services depending on network capabilities; working with customers to retrieve the best value from mobility in their context but every case different depending on regulations, level of equipment with phones, connectivity, ratio of banked population and payment ecosystem already in place since one size does not work; has to have flexibility in the solution; will become mainstream since merchants earn cost savings and accrued knowledge of consumers

Firm	UK -- Monitise
Regulation	Avoids a lot of regulation with regard to finance and telco
Innovation/Technology	Mobile wallet: a digital service accessed via the web or mobile application that authorizes transactions from one or more payment sources and enables other commerce related features (value added services to generate new revenues)
Service	middle man company between banks/telcos/internet providers depending on what service banks are looking for
Customers	Customers are banks, telcos, other tech firms
Theme	uses multipoint solution; loyalty schemes; deep customer engagement to leverage key aspects of data on consumers
Players	digital wallets are a threat to financial services and will drive a wedge between customers and banks; complicated interaction but need partners and compete with partners
Process	Very time consuming to build hurdles of payment system better alternative, drive adoption, become viable
Other	biggest threat is from internet providers not from telcos for banks; need to focus on consumer needs