

The Impact of mFinance Initiatives in the Global South: A Review of the Literature

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1 Introduction

After more than two decades of research on technological interventions in the transition to information societies, the burgeoning of mobile phones in developing countries (ITU 2013) has shifted the information and communication technologies for development (ICTD) research lens to the different domains of mDevelopment. While advances have been made in domains of mHealth, mGovernment, mBusiness and mEducation, mFinance initiatives have had impressive adoption upon implementation in certain geographic locations. Services such as M-Pesa have been widely reported in the mainstream press and form the test beds for various scholarly investigations.

Due to these unique geographical successes (and less-reported failures), scholars have attempted to determine the factors behind the widespread adoption of mFinance applications. Prior reviews of the mFinance literature, largely reliant on studies conducted in industrialised nations, have focused primarily on technological and business-related success factors (Dahlberg et al. 2008; Dewan 2010; Ngai and Gunasekaran 2007). This review builds upon the work of Duncombe and Boateng (2009) in investigating the impact of these mFinance initiatives within a development context. Our aim, however, is to determine the relative focus of mFinance research, focusing on the bottom of the pyramid (Prahalad 2006). In this

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chapter, we contextualise the BoP within low- and middle-income countries and study mFinance initiatives in terms of technological inputs, mechanisms of adoption and the resultant outputs, or impact.

First, however, it is worthwhile to reflect upon existing, and propose alternative, definitions for the notion of impact of mFinance.¹ The traditional approach to measuring impact has relied on an economic perspective, measured in terms of increased productivity, income and savings. Developmental impact is alluded to multiple indirect indicators of financial effects at a variety of levels—structural, group and individual—rather than the resultant social, economic and cultural effects (Donner and Tellez 2008) of technology introduction, adoption and appropriation. As a result, scholars believe there is an issue assessing the broader development impacts of mFinance applications and interventions in a concise and coherent manner (Alampay and Bala 2010; Heeks and Molla 2009).

In this review, we focus on the development outcomes of mFinance initiatives. It is therefore important to provide our perspective on development. Development is understood as people achieving a better quality of life, meaning “being healthy, being well-nourished, being literate, etc.” (Sen 1988: p. 16), and following Sen, freedom of choice. As Kleine (2010: p. 683) remarks, ICT are “multi-purpose technologies which offer far more significant changes to people’s lives than the economic impact they might have”. Relating and applying this notion of development with mFinance issues, we consider mFinance development outcomes not merely as economic, due to the nature of the assets that these services manage, but extending to other aspects, such as empowerment.

mFinance can be understood as “a set of applications that enable people to use their mobile telephones to manipulate their bank accounts, store value on an account linked to their handset, transfer funds, or even access credit or insurance products” (Donner 2008a: p. 3–4). Different transactions can be made through mFinance applications, as is being observed at a global scale, within the context of the industrialised economies. Typically, users can make person-to-person transfers of cash and airtime, make payments to retailers, receive bank statements, enquire about balances and top-up mobile phone credits (Casanova 2007; Wishart 2006). It is also possible in some cases to request and receive notifications about activity in the client’s bank account, which has become a way to manage risk, for example, managing incoming transfers into bank accounts (Scornavacca and Hoehle 2007), and outgoing expenditures related to credit card use. In some countries, mFinance services allow customers to receive international remittances, pay bills or a loan, receive their monthly payroll or receive social security payments (Casanova 2007).

In developing countries, mFinance harnesses the rapid expansion of mobile phones among low-income users. In general, for this group, the benefits include

¹The field uses various terms to describe the use of mobile networks to conduct financial transactions, including mBanking, mCommerce, mMoney, mPayments, mRemittances, mTransfers, etc. We choose to use the all-encompassing term mFinance and use the individual terms in the literature review and in the search methodology as appropriate.

faster and cheaper, and sometimes safer, banking transactions and payments. The most evident benefits are when transacting with social networks located in remote places where the lack of physical outlets is a limitation to accessing the formal financial system. Therefore, mFinance, by avoiding long journeys to bank branches, translates into savings in time and money (Datta et al. 2001; Donner 2007; Jones and Du Toit 2007; Rosemberg 2008; World Bank 2002) and avoidance of riskier informal routes (Jagun et al. 2007).

Besides these benefits, mFinance services “holds the prospect of offering a low cost, accessible transaction banking platform for currently unbanked and poorer customers” (Heeks and Jagun 2007; Porteous and Wishart 2006: p. 5). In other words, it appears that mFinance initiatives have the potential to expand financial services to those who have been previously systematically excluded (García et al. n.d.; Hughes and Lonie 2007; Mendes et al. 2007). mFinance offers to poor people, who normally belong to the informal sector, financial services such as “access to payments, transfers and stored value functionality without opening an actual banking account” (Donner 2008b: p. 8). The benefits in terms of economic development, or poverty reduction, include the power to access loans and insurance towards productive investment. The poor are thus potentially better able to take control of their own livelihoods (Donner 2007; Economist 2008). On the supply side, mFinance applications allow the banking sector to discover new business models targeting new segments at differential cost levels, leading to a disaggregation of the bank components (Klein and Mayer 2011). We definitely note that the scope of benefits that mFinance offers serves not only the poor but also the banks, hence strengthening their profits. This is just another example of the complex nature of the development initiatives.

Nonetheless, the question that arises is whether this ICT-based system is actually producing development impact for the bottom of the pyramid. Does the delivery of banking services via mobile phones lead to productive saving and investment, in turn translating into poverty reduction for the poor, or is it more beneficially suited for low-income customers? In developing countries, the regular banking system may not necessarily provide benefits for the poor, so there is little motivation to move from informal ways of economic transactions to more formal ones. A second idea focuses on foreign (both inter- and intra-national) worker remittances. Prior research conflates process improvements such as volume, frequency, speed and cost with development outcomes of remittances such as households “retaining a higher proportion of the money by paying lower fees” (Donner and Tellez 2008: p. 328; van Reijswoud 2007), leading to optimism about benefits (Heeks and Jagun 2007).

These arguments suggest that even though the potential of mFinance seems to be enormous, we believe that evidence of how these applications impact on the livelihoods of the poor has been prematurely assessed as having a net beneficial impact. Supporting this viewpoint, the prior literature reviews report gaps in the conceptualisation and measurement of the impact of mFinance (Dewan 2010; Duncombe and Boateng 2009; Ivatury and Mas 2008). Key issues highlighted by the literature related to adoption of mFinance systems include security and trust (Karunanayake et al. 2008; Mousumi and Jamil 2010).

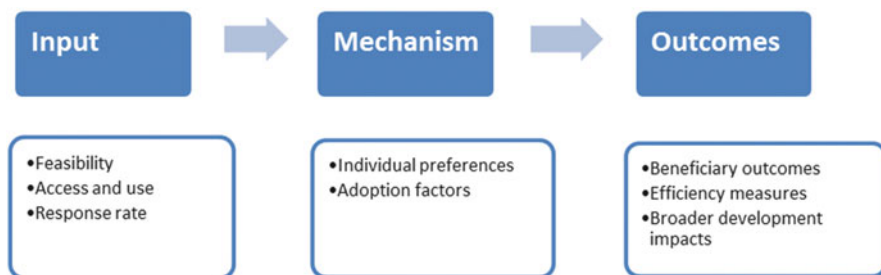


Fig. 1 The Pathway Model

This chapter first interrogates the notion of impact of the mFinance initiatives. To do so, we approach the framework for measuring impact inspired by ICTD areas in which impact assessment is more advanced. The first research question we pose investigates how impact is conceptualised in the mFinance literature. What alternative definitions of impact can be proposed, beyond traditional notions of economic development (i.e. income and savings)?

In order to contribute to the discussion on impact measurement issues, this paper utilises the pathway of effects framework, the input-mechanism-output (IMO) model (Chib et al. 2014), as a framework for assessment. This framework is similar to the Duncombe and Boateng (2009) model with respect to a technical design and development phase and subsequent adoption and impact phases.²

The IMO model was chosen because it is one of the assessment frameworks that explicitly relate inputs and outcomes, adding rigour to the impact assessment, such as that provided by the Cost-Benefit Analysis (CBA) model (Heeks and Molla 2009). However, the IMO model offers a more flexible tool than the CBA framework, which is only based on a financial assessment.

Specifically, the terms in the IMO model (see Fig. 1) assist in the identification of the focus of the articles reviewed, where input refers to the access and use of technology being introduced. The second category, mechanism, relates to the process of user adoption and appropriation. The third category, outputs, comprises the process outcomes and end-user benefits, i.e. impact of mFinance initiatives.

The secondary research question posed interrogates the mFinance literature in terms of understanding technological inputs, mechanisms of adoption and outputs such as process improvements and end-user impact. The objective is to understand the focus of the mFinance research that has been conducted and, in doing so, to calibrate these efforts towards providing greater evidence of impact, using relevant theoretical frames and rigorous measures.

²The category of needs identification has been dropped for two reasons: the first being the focus of this chapter is impact and, second being, the low incidence of articles in this category found in the review of the literature.

The methodology utilises a secondary literature review of peer-reviewed and non-peer-reviewed sources, including the grey literature. Despite a significant amount of literature on mFinance contextualised in the developed world, we concentrate on underprivileged populations in the developing world and how mobile applications contribute to both livelihoods and a broader development perspective.

2 Methods

2.1 Inclusion and Exclusion Criteria

We included research papers fulfilling the following inclusion and exclusion criteria. Only research studies focusing on the application of mobile technologies to financial services in low- and middle-income countries (as categorised by the World Bank) have been included. We excluded research which studied mobile devices other than mobile phones and which focused on banking or commerce undertaken in high-income countries. Only English language papers were considered, although this may imply excluding valuable literature in other languages and therefore note that concentrating only on the production of English-speaking researchers is not representative of the developing world.

From a process perspective, we first demarcated the boundaries of the investigation to include mFinance research from a broad range of disciplines, with articles drawn from development studies, economics, banking and finance, technology and innovation, management and information systems, and information and communication technology for development (ICT4D). Because many of the studies have been disseminated by practitioners, published in the grey literature and focused on a consumer perspective, the scope of the present review includes peer-reviewed academic papers, published in scientific journals and/or conference proceedings, as well as non-peer-reviewed papers. As a result, commercial, government and international cooperation papers have also been included.

As the review focused on the impact of these mFinance applications on poor people's livelihoods, we examined primarily the individual and community levels (micro level) of analysis. Therefore, papers related to macro-level phenomenon, such as government policies related to the regulatory environment and market forces of demand and supply, and organisational perspectives of readiness assessments and business models were excluded.

2.2 Search Methods

The authors used mFinance related search terms such as mCommerce, mFinance, mBanking, mMoney, mPayment, mRemittances, mTransfers and MFS (and their m- and mobile- versions) to search the following electronic databases: Academic

Search Premier, ACN, Business Source Premier, Communication & Mass Media Complete, EBSCOhost, PsychINFO, Science Direct, SciVerse Scopus and Web of Science. Google Scholar was also used as a search tool under the mentioned terms. Reference lists of studies identified as relevant were also searched as a means of creating a snowball sample. Two co-authors were involved in the search process, so as to ensure maximum reach; specific search methodologies or analyses were not utilised other than as described. We note here that this review is not meant to be exhaustive and all-encompassing; it merely wishes to develop a sample sufficient enough to generalise trends for the adoption, use and impact of mFinance initiatives in developing countries.

2.3 Data Extraction and Analysis

The authors merged search results across databases, removed duplicates and screened citations against inclusion and exclusion criteria. Data were extracted using a standardised form created in Microsoft Excel including descriptive, inputs, mechanism factors and outputs (and can be made available upon request). Statistical pooling of results was not possible due to the extensive heterogeneity of the study methodologies. The papers were further categorised according to the type of main intervention. When studies focused on factors fell under more than one category, we chose to concentrate on the main intent of each study. Where studies exhibited more than one category in a significant manner, we examined the linkages.

3 Results

We found 41 studies addressing one of the three stages of the pathway, *input-mechanism-output*, as shown in Fig. 1. The majority of the studies 29 out of 41 studies analysed were in the mechanism stage, elaborating on factors leading to adoption of mFinance. We next elaborate on the specific studies constituting each stage.

3.1 Inputs

Eleven mFinance studies were concerned with input issues related to access and use and technological aspects, such as infrastructure requirements, and software and hardware issues. Key concepts relevant to developing countries that emerged relating to inputs included access; affordability; literacy, both textual and financial; security; and gender issues.

Unsurprisingly, mobile access was mentioned as the primary technological requirement (Duncombe 2009). Widespread coverage provides ubiquitous access

to the user while high-speed SIM cards (e.g. 64 Kbps) were recommended to best utilise the mobile network (Mariscal and Flores-Roux 2011), while Hossain and Khandanker (2011) consider mobile handsets with advanced options. Access to technology was mentioned by Arora and Cummings (2010), in order to enable the mobile phone bank branch. Within a developmental context, affordability cannot be delinked from mobile access, especially for the low-income and poor segments of the population (Mariscal and Flores-Roux 2011; Zainudeen et al. 2011). From the user point of view, money is needed to access and use these systems, and the lack of affordability represents a constraint to access and use (Boadi et al. 2007; Duncombe 2009). Boadi et al. (2007) consider whether rural fishermen in Ghana could afford the needed investment to access both the fixed costs of equipment and the variable costs of mobile subscription services.

Studies of the optimal system infrastructure required for SMS-based mobile banking systems reaching not only urban but also remote rural areas of developing countries identify security as a key issue (Hossain and Khandanker 2011). A technological solution describes a push-pull system, wherein either the bank broadcasts information or the customer requests banking services (Mousumi and Jamil 2010). However, other studies point to human resource approaches to the issue of trust. One approach relies on banking agents for mobile ATM service (Karunanayake et al. 2008), while another mentioned cash-in, cash-out points (Singh 2009), conceptualised as partnerships with retail stores (Mariscal and Flores-Roux 2011).

A lack of literacy skills has been mentioned as a barrier to use of text-based services in Uganda (Duncombe 2009). A study of adequate mobile payment user interfaces for non-literate and semi-literate subjects concluded that non-text designs were strongly preferred over text-based designs (Medhi et al. 2009). Furthermore, while the use of rich multimedia user interfaces reported better task-completion rates, the spoken-dialogue system was faster and required less assistance.

Beyond textual and numerical literacy, financial literacy is considered an important factor in order to adopt the mobile financial systems. Financial literacy is understood by BCG (2011: p. 12) as the “advantages of becoming banked”. Lack of financial literacy was a constraint to assimilating the required skills to interact effectively with mobile phones and mFinance technologies. Looking at financial literacy issues from a gender perspective, Singh (2009) examines issues of women empowerment via financial inclusion, proposing design principles that invoke a sociocultural perspective, including gender patterns of financial control and issues of privacy and trust in the transaction.

3.2 *Mechanisms*

The largest group of studies ($n = 29$) investigated the reasons for technology adoption, with some using theoretical models for explanation or validation of the findings. Many researchers examined mobile banking as an emerging ICT artefact

from the perspective of user adoption of information technology (Min et al. 2008; Zhou 2015). The most commonly used theories in information technology adoption included the theory of reasoned action and its extensions, the technology acceptance model (TAM), the extended TAM and the unified theory of use and acceptance of technology. Less studied explicitly, the importance of context and sociocultural factors in affecting or mediating mobile adoption was nonetheless emphasised (Crabbe 2009; Bankole et al. 2011; Donner and Tellez 2008; Najafabadi 2012; Zainudeen and Ratnadiwakara 2011; Berman 2011).

These findings are similar to an earlier review (Ha et al. 2012) which acknowledged the preponderance of TAM as an explanatory framework. Ha et al. (2012) identify key factors for the adoption of mobile banking as perceived cost, perceived risk, perceived usefulness and perceived compatibility. We elaborate on these factors found in the current review within the developmental context plus ease of use, as a key construct of the TAM.

The perceived cost of financial services had mixed evidence as a factor for adoption despite being identified as the main barrier in a number of studies (Alampay and Bala 2010; Bankole et al. 2011; Cruz et al. 2010; Joubert and Van Belle 2009; Lu et al. 2011; Medhi et al. 2009; Sripalawat et al. 2011; Tobbin 2012). It is important to note that perceived cost in this instance is defined in relationship to individual motivations to adoption of mFinance innovations rather than as an access barrier, as seen in the *Inputs* sections. Despite the lack of financial wherewithal being a barrier to adoption of mFinance services (Sripalawat et al. 2011; Tobbin 2012), Cruz et al. (2010) argue that cost is relevant only for specific groups, typically young, low-income males with high education levels. On the other hand, in the case of the EKO mBanking system, Nandhi (2012) reports that one-third of users became inactive following the introduction of transaction charges for deposits and withdrawals.

Lu et al. (2011) suggest that the perception of cost of mobile payment services exists only in the student group and not among salaried workers. On the other hand, low cost was perceived as a positive factor for adoption (Bankole et al. 2011; Joubert and Van Belle 2009), such as in the case of WIZZIT mBanking services (Ivatury and Pickens 2006). Extending the definition of costs as a determining factor in adoption of mFinance services beyond economic measures, Ha et al. (2012) propose that both tangible and intangible costs, such as transaction and switching costs,³ should be taken into account.

Perceived risk was also found to be negatively associated with behavioural intention (Brown et al. 2003; Cruz et al. 2010; Joubert and Van Belle 2009; Lu et al. 2011; Morawczynski 2009; Rejikumar and Ravindran 2012; Sripalawat et al. 2011; Teo et al. 2012; with the exception of Bankole et al. 2011) while relative advantage

³Both transaction and switching costs are understood by Ha et al. (2012: p. 223) and are referred “to the efforts required by the user to adopt the service”. An example of transaction cost is the time for performing a task, and an example of switching costs is the costs of changing from a platform to another.

(Cruz et al. 2010; Lu et al. 2011; Püschel et al. 2010; Zainudeen and Ratnadiwakara 2011), perceived usefulness (Bankole et al. 2011; Teo et al. 2012) and perceived ease of use (Cruz et al. 2010; Bankole et al. 2011; Püschel et al. 2010; Teo et al. 2012) were found to be positively associated with behavioural intention.

Perceived risk concerns security issues related to the disclosure of personal and financial information (Brown et al. 2003; Shen et al. 2010) and has been identified as a major negative factor to the adoption of mFinance services (Cruz et al. 2010; Ha et al. 2012; Teo et al. 2012) including theft and losses occurring during mRemittances (Medhi et al. 2009). In the same sense, the more positive perceived security and privacy, the more likely intention to use SMS banking was found by Amin and Ramayah (2010). Perceptions of the risks of mBanking had an adverse impact on perceptions of service quality and satisfaction (Rejikumar and Ravindran 2012). Further, risk was identified as a barrier in specific user groups such as women between the ages of 35 and 55 with higher income (Cruz et al. 2010) and not in other groups, as users experienced with online transactions minimised such risks (Sripalawat et al. 2011).

As a consequence of the risk involved in mFinance adoption, trust factors influenced the adoption and usage of mFinance (Joubert and Van Belle 2009; Medhi et al. 2009; Lu et al. 2011; Tobbin 2012). Joubert and Van Belle (2009) find that service provider risk exerted a significant negative influence on adoption. Lu et al. (2011) find that customers' initial trust in mPayment services positively affected their perception of relative advantage, which, in turn, increased their intention to use. Interestingly, similar to earlier findings, trust that had developed during prior Internet payment experiences transferred to mobile environments. Clearly, perceived credibility of the service provider is an important component of trust. This was seen in the case of adopters in Kenya, who acquired a great deal of trust in the new channel due to the marketing of the service by the provider Safaricom and strong pre-existing ties with local prepaid talk-time agents (Crabbe et al. 2009). Berman (2011) reports that M-Pesa users were afraid of losing their money, and in attention to this, Safaricom designed the paper logbook to provide users a feeling of safety, verifying the completion of the transaction.

Trialability, defined as "the extent to which users would like an opportunity to experiment with the innovation prior to committing to its usage" (Agarwal and Prasad 1997, as cited by Brown et al. 2003), has been identified as a factor that influences the initial adoption of cell phone banking (Brown et al. 2003; Brown and Molla 2005). Post-adoption, service quality was found to be a strong predictor for continuance intention (Rejikumar and Ravindran 2012; Zhou 2013).

Perceived compatibility was mentioned as a factor that influenced adoption of mFinance services by various authors (Brown and Molla 2005; Ha et al. 2012; Joubert and Van Belle 2009; Lu et al. 2011; Teo et al. 2012). It was defined as "the extent to which adopting the innovation is compatible with what people do" (Tobbin 2012: p. 3). Their findings also confirmed the effect of perceived ease of use on perceived compatibility, and at the same time, perceived usefulness and perceived compatibility played a mediator role in the relationship between perceived ease of

use and behavioural intention. Related to the perception of compatibility, users' adoption was found to be determined by the task—technology fit, understood as “the fit between the technology characteristics and task requirements” (Zhou et al. 2015: p. 760).

Brown et al. (2003) broadly define perceived usefulness as “the variety of banking products and services required by an individual” (Tan and Teo 2000). Crabbe et al. (2009) find that it was the major factor that influences attitude of non-users while sustained usefulness played a minor role. Other studies also found perceived usefulness as an influencing factor (Sripalawat et al. 2011; Bankole et al. 2011; Ha et al. 2012). Dass and Pal (2011) find that the drivers for adoption of mFinance applications among the rural under-banked were the demand for banking and financial services and the difficulties of accessing them.

Ease of use includes convenience, understood as the “time saved by transacting at an m-banking agent store location” (Medhi et al. 2009), which was an important feature for interviewed subjects (Ivatury and Pickens 2006; Medhi et al. 2009). Perceived ease of use has been mentioned by Bankole et al. (2011), Sripalawat et al. (2011), Teo et al. (2012) and Tobbin (2012). Teo et al. (2012) find that the effect of perceived ease of use (PEOU) on perceived usefulness (PU) and perceived ease of use (PEOU) on perceived compatibility (PC) was the most influential determinant of mobile payment acceptance.

It should be noted that interviewed users associated banks with long queues and were impressed by the speed of the mobile payment systems, with which the transaction was completed, even in cases where there were delays. Tobbin (2012) points out that most participants emphasised time saving and convenience as a motivation to use mBanking.

From a cost-benefit perspective, convenience was seen as a key benefit of mobile banking (Shen et al. 2010) and a major influence on the adoption intention of the mobile banking systems. In early adopters who already had multiple mCommerce interactions, convenience was found to be more dominant than trust and risk in determining intention to use mCommerce (Joubert and Van Belle 2009). In addition, the perceived behavioural control, understood as the extent to which an individual perceives the situation is under his or her control, was found to positively influence the convenience perception.

Finally, image, defined as “the extent to which users of mobile payment systems have more prestige and a higher profile, where using these systems is considered a status symbol”, is reported by Joubert and Van Belle (2009) as one of the three most significant factors that influence mobile payment systems adoption. Additionally, Lu et al. (2011) find that it strongly increases the intention to use such services and that it is also a strong determinant of behavioural intention. Related to image are subjective norms, understood as “a person's perception that most people who are important to her or him should or should not perform the behaviour in question” (Fishbein and Ajzen 1975, as cited by Amin and Ramayah 2010: p. 3). Subjective norms, in addition to attitudes, were significantly associated with intention to use banking via SMS.

Prospective mFinance users were studied with contrasting findings. Dewan and Dewan (2009) find that most respondents were interested to conduct banking via mobile phones, while an IMTFI study (2011) observes that unbanked respondents preferred banks as mMoney providers, although banked ones preferred mMoney network operators. At the same time, perceived service quality and satisfaction were essential prerequisites for continuance decisions of the customer with mobile banking in Kerala (Rejikumar and Ravindran 2012).

3.3 *Outputs*

The final set of outputs studies ($n = 8$) was most relevant to show actual transformational benefits of mBanking. Yet, only a handful of research studies was found in this category (Arora and Cummings 2010; BCG 2011; Berman 2011; Boadi et al. 2007; Morawczynski 2009; Nandhi 2012; Ndlovu and Ndlovu 2013; Zainudeen et al. 2011).

We found that studies based on theory (Morawczynski 2009) overlapped more with output studies than input studies (Zainudeen et al. 2011). Only three studies (Arora and Cummings 2010; BCG 2011; Morawczynski 2009) concluded with an emphasis on outputs such as financial inclusion, acceleration of the economic growth and employment. The rest of the studies did not address quantitative impacts on mBanking.

Five studies reported non-quantitative impacts (Berman 2011; Boadi et al. 2007; Nandhi 2012; Ndlovu and Ndlovu 2013; Zainudeen et al. 2011). The majority of these studies found economic impacts, specifically issues such as savings, increased income and financial inclusion. In terms of savings, Nandhi (2012) finds an increased ability to save in 90 % of interviewed users. Boadi et al. (2007) also notice cost savings for rural businesses.

Increased income was stated by Berman (2011) for business agents, although an increased business competition was also found. Ndlovu and Ndlovu (2013) report that mobile banking brings economic activity to rural communities. Finally, Zainudeen et al. (2011) consider that CellBazaar extends the market size of the business by connecting buyers and sellers. Aside from economic impacts, Boadi reports improvements in communication, as better information flows for rural businesses. It is important to note that most impact studies were not focused on the poor.

3.4 *Links Between Stages: From Inputs and Mechanisms to Outputs*

In this review, special attention was paid to articles that linked the various stages, inputs to mechanisms to outputs, such that some relationships could be established

between the three stages. Seven articles fell under this category;⁴ some of them linked inputs to outputs (Arora and Cummings 2010; BCG 2011; Boadi et al. 2007; Zainudeen et al. 2011), while others linked usage of different mBanking systems (mechanisms) to outputs (Berman 2011; Morawczynski 2009; Nandhi 2012). It is worth elaborating on these studies.

In assessing the direct impact of mobile phones on farming and fishing businesses in Ghana, Boadi et al. (2007) find adoption of mCommerce has brought about benefits in terms of better information flows, enhanced marketing activities, operational efficiencies and cost savings for rural businesses. They considered affordability to acquire the handsets and service as the main investment or input that enable this impact.

Arora and Cummings' (2010) Indian case study, focused on *A Little World*, provides insights about how the Zero technological platform created value for the different actors involved. The platform interacts with Near Field Communications (NFC) technology-enabled mobile phones, contact-less Radio-Frequency Identification (RFID) Smart Cards, integrated biometrics authentication system and a transaction server, which resulted in convenient mobile transaction solutions for branchless banking and financial transactions.

Notably, the system also includes the human factor in the form of Customer Service Points, manned by village women appointed by the local village self-help groups (SHGs) (Arora and Cummings 2010: p. 9). These women were supported by the SHGs, who in turn ensured their trustworthiness and responsible behaviour.

The outputs mentioned include economic, social and environmental factors. In terms of economic impact, the article claims income enhancement from the women's employment for 16,000 individuals. Each customer service point earns Rs. 10 for every enrolment and Rs. 500 or 0.5 % of monthly transactions, which comes to about Rs. 1,000. This total amount is divided between the village (20 %) and the CSP, thus arriving at an average income for each woman of about Rs. 400 (approximately USD 6.30). Even though the calculation is precise, a comparison between the income of these women and a control group is needed to realise a clearer impact. In addition, villager's trips to and from the post office and bank branches are avoided to save money. The article also highlights the profits of the microfinance agents and other business actors.

Linked with the economic impact, some social and environmental effects are mentioned. These include the social recognition and status of employed women, a higher self-esteem which comes from a better control over one's own money, a reduction in rural-urban migration and the change of power dynamics within villages. Furthermore, the identification cards give a sense of identity and empowerment to villagers. The environmental impact is conceptualised, though not tested, as the waste saved when compared to that produced by a physical bank outlet.

⁴Four articles were excluded because they referred to potential outputs but failed to provide evidence of real effects.

Zainudeen et al. (2011) point to factors that contributed to emergence of *CellBazaar* and enabled it to reach a wider market, including high mobile penetration; affordability of access; association with Grameenphone, the largest mobile provider; and the entrepreneurial culture of Bangladeshis.

The success of *CellBazaar* demonstrated positive outputs for users of the service. For example, it enabled buyers and sellers of many kinds of goods and services in all parts of Bangladesh to connect with each other, extending the market size of the business. It also provided convenience for consumers by reducing the need to travel to buy a product and encouraged a thriving business environment.

The BCG (2011) report reviewed the preconditions for adoption of mobile finance services and linked them to the socioeconomic impact of these initiatives. Consumer education, understood as financial literacy, was mentioned as an input. The study quantified impact in terms of financial inclusion, finding that it ranged from a 20 %-point increase in Pakistan (from 21 to 41 %) to a 5 %-point increase in Malaysia (from 90 to 95 %). The other three countries were likely to experience an impact of around 10–12 % points.

Morawczynski (2009) studies the usage of M-Pesa through ethnographic fieldwork of an informal settlement near Nairobi and a farming village in Western Kenya. This study identified several factors (and events) that affected the use of mBanking. For example, the post-presidential election violence in December 2007 increased usage as mBanking was the only means to access cash. Seasonality and seasonal pricing also influenced how mBanking was used. During the harvesting and planting season, farmers solicited funds to pay for seeds and fertilisers. Due to seasonal pricing, some farmers bought stock when the prices were lower. From a gender perspective, the author found that women frequently used mBanking services to store their “secret savings” to decrease the risk of money being stolen or found by their domineering husbands.

These findings about uses of the application were interpreted and followed by findings about outputs. The most significant of the outputs generated by M-Pesa usage was a reduction in vulnerability, a measure little studied in other mFinance research. mFinance usage enabled urban migrants and subsistence farmers access to financial assets during the post-election period and “hunger months”. It also provided a platform through which funds could be instantly sent to address urgent situations such as the onset of illness. A major determinant of adoption was ease of use, where recipients did not need to wait for the money to physically travel from the city. M-Pesa also helped rural–urban migrants to maintain their social networks by fostering money transfers between urban centres and rural areas. The gender perspective on beneficial outputs suggests that the application helped to reduce the vulnerability of women by providing them with a safe storage place, while simultaneously providing more financial autonomy and decision-making.

The M-Pesa application also facilitated another important outcome—it helped users to generate additional income. By sending money weekly or biweekly, the total amount remitted increased by 20–40 %. The recipients saved money on the transfer as they no longer needed to pay travel expenses when retrieving their cash. Finally, the application extended the network of potential remitters and lenders. Subsistence

farmers found it easier to acquire small amounts of money from a larger base of contacts during the lean season. As a consequence, there was an increase in the gross remittance of inflows.

Departing from the techno-optimism and lack of negative results found in the literature review, this study took a critical perspective on the impact of mFinance usage. The author noted that, in some instances, M-Pesa usage engendered less than ideal outcomes—it weakened relations between urban migrants and their rural relatives because the former decreased their visits home.

Berman (2011), focusing on M-Pesa, describes the different uses across three distinct areas. In rural areas there were small withdrawals, with some flows back to urban areas to support family and students settling into new lives. Users included illiterate persons who relied on clerks to operate the system. In urban areas, however, the system was frequently used for business (mPayments), constituting greater amounts of money. In contrast, poor customers on the mainland were more regular in their usage of M-Pesa as savings accounts.

Evidence for outputs in the 2011 Berman study is mixed. On the one hand, the service created more business opportunities for agents, increasing their incomes. At the same time, it helped create a number of jobs. On the other hand, agents in Mombasa and Likoni referred that the proliferation of M-Pesa agencies brought about increased competition. Whether this resulted in better prices and services for marginalised consumers is unclear.

Nandhi (2012) investigates the usage of EKO, India's Simplibank mBanking system, finding that a high percentage of users save in EKO for emergencies, which is considered a robust substitute to many informal savings mechanisms, as well as a bank account. At the same time, the service is used in conjunction with, or as complementary to, existing saving practices.

The outputs reported in EKO were diverse. Ninety percent of users stated that their ability to save had increased after opening an EKO account due to the following reasons: (1) the service was much safer than keeping cash on hand; (2) the mobile account helped users to avoid wasteful expenses and to save, thus improving saving habits; and (3) small amounts and more frequent savings were more feasible.

4 Discussion and Conclusion

The analysis of 41 research studies on mFinance in developing countries is illuminating not only in what it reveals but in the shadows that permeate the field. The findings indicate that most of the studies were in the mechanism stage, suggesting that there is sufficient academic interest in investigating the factors that lead to success of mFinance initiatives. It is however heartening to note that the emphasis has moved from technological inputs and measures access. However, the fact that success within this mechanism's frame limits itself to adoption suggests that we are at a fairly nascent phase of understanding the deep impacts that such a technological revolution could offer marginalised populations.

This is not to suggest that there is a sophistication to the unique study of mFinance. The theoretical models applied to garner understanding are borrowed from other disciplines, and the lack of consensus about the key factors may lead one to imagine that a number of factors are a major influence underlying adoption of mFinance. While such approaches may be an inherent characteristic of the academic approach, there is the potential and fairly serious risk of confusing practitioners and policymakers seeking to guide investment to initiatives that produce impactful results.

From this review we consider two issues as significant. First, trust is highlighted as a mechanism factor that leads to adoption. As the poor relies more on physical money and face-to-face relationships and mediations to exchange money, issues of trust may be important for future research, to understand more of its functions and how to manage it. It is important to note how the literature reports that trust can be transferred, being this a remarkable feature to be applied by mFinance practitioners. Second, the review has come through interesting literature, discussing and deepening issues of affordability. Even though it is considered a main barrier for adoption, the literature shows that cost is relevant only for some groups, showing that the poor should be thought of as a heterogeneous group. That being said, it is the rare study that focused on the poor.

Indeed, despite the rhetoric (*potential* is a term much associated in the literature with mFinance) and the related optimism, there is little evidence that mFinance has made a substantive impact on the well-being and empowerment of the poor. Certainly there is evidence that mobile phones are being widely accessed and used by the poor; the uptake of mFinance services is sketchy at best, with little conclusive evidence of their benefits to those at the bottom of the pyramid.

Assessing the few papers that focus on outputs from the perspective of the ICT4D Value Chain (Heeks and Molla 2009), it appears to be that almost all the outputs may be categorised as outcomes of financial inclusion, cost savings and improved communication. Nonetheless, there is no study bringing evidence of net beneficial financial impacts, comparing regular finance services and transformational mFinance ones and balancing invisible costs to access the latter. In our opinion the next aims to be assessed in mFinance research projects should focus on development impacts as outlined previously in terms of capabilities and empowerment.

Towards this end, the definition of impact has largely been examined within a financial lens, ignoring the changes that are wrought in individual and community contexts. As one example, broadening the impact of mFinance to encompass gender perspectives may contain revelations about the pressures being exerted upon traditional patriarchal structures by the access to savings, investment and entrepreneurship by women with mobile phones and the resultant fissures and power struggles that accompany such transformational social change.

Alternative approaches may understand contributions to well-being, including the capabilities approach (Sen 2001) and sustainable livelihood framework, stressing social inclusion and development domains such as improvements in poverty alleviation, living conditions, education, health (World Economic Forum 2011)

and gender equality, among others. We hope that this contribution to the field of mFinance may lead to both broader and deeper investigations that shed light on this complex yet potentially extremely rewarding field.

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