

**Examining the Adoption, Usage and Outcomes of  
Mobile Money Services  
The Case of M-PESA in Kenya**

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## **Declaration**

I declare that the following thesis is my own work and that, to the best of my knowledge, it contains no material that overlaps with that submitted for the award of any other degree at any institution, except where due acknowledgement is made in the text.

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## **Abstract**

This thesis will examine the adoption, usage and outcomes of a mobile money service called M-PESA. Since being launched in 2007, the service has seen phenomenal growth in Kenya. Over 7.5 million users, or 34% of the adult population, have registered with M-PESA. Such growth is impressive as it has surpassed other ICTs in the country. This includes the mobile phone, which has been hailed as the fastest growing ICT in Africa. It has also surpassed the growth of mobile money in the North, where many services have been discontinued because they failed to attract a sufficient number of customers. M-PESA thus provides an interesting case of an ICT growing rapidly in the South, and “failing” in the North. In this context, the first part of the thesis examines why such rapid growth occurred.

This analysis is presented from two perspectives. First, the socio-technical systems framework is used to present M-PESA as a complex system rather than an isolated application. This perspective makes clear that M-PESA grew rapidly because it had a dedicated team of system builders. These individuals took numerous strategies to enroll the elements and maintain the stability of the entire system. They further worked to engineer the social, economic, legal and political environments of the technology.

Growth is also explained from the perspective of the user. The thesis makes clear that M-PESA was widely adopted because it fit into existing social practices and systems of logic. In other words, it helped users to do what they were doing before the technology was introduced. This includes money transfers back home. It also includes savings. The thesis further reveals that financial practices began to change as M-PESA became integrated into daily life. For example, users began to send money home more often. They also increased the number of their savings transactions. Such changing practices engendered a variety of consequences to daily life. This includes rising household incomes in the rural areas. It also includes new struggles over limited resources. The impacts, or wider-scale implications of usage, are also discussed. The analysis shows that a whole industry for mobile money developed as a result of M-PESA’s success.

The thesis makes a contribution to knowledge in several ways. It presents a case of domestication in the South and highlights the unique factors that shape this process, from wide-scale political violence to structures of debt and obligation. It further makes the relationship between technologies and impact more clear. It shows that the technology itself does not engender the outcomes. It does, however, have a role in shaping the practices that do.

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## Abbreviations

AML/CFT	Anti-Money Laundering/ Combating Financial Terrorism
ARPU	Average Revenue per User
ASCAs	Accumulating Savings and Credit Association
ATM	Automatic Teller Machine
CBA	Commercial Bank of Africa
CBD	Commercial Business District
CBK	Central Bank of Kenya
CSR	Corporate Social Responsibility
DFID	Department for International Development
ePSO	Electronic Payment Systems Observatory
FDFC	Financial Deepening Challenge Fund
FSA	Financial Services Authority
GDP	Gross Domestic Product
HDI	Human Development Index
ICTD	Information Communication Technologies for Development
ILO	International Labour Organization
IMF	International Monetary Fund
IPO	Initial Public Offering
ITU	International Telecommunications Union
KCYP	Kibera Community Youth Program
Ksh	Kenyan Schilling
KYC	Know your Customer
MFI	Microfinance Institution
MSE	Micro and Small Enterprises
MSR	Microsoft Research
MO	Mobile operator
M4D	Mobiles for Development
NPS	National Payments System
OLPC	One Laptop per Child
OMF	Outcome Mapping Framework
P2P	Person to Person
POS	Point of Sales Terminal
PPP	Public-Private Partnerships

RFP	Request for Proposal
ROSCAs	Rotating Savings and Credit Associations
SAPs	Structural Adjustment Programs
SACCOs	Savings and Credit Co-operatives
SCOT	Social Construction of Technology
STK	Sim Toolkit
UNDP	United Nations Development Program
UI	User Interface
WSIS	World Summit on Sustainable Development



# Chapter 1: Introduction

## 1.0 Introducing M-PESA

In March of 2007 a mobile money service<sup>1</sup> called M-PESA was introduced into the market by Safaricom, Kenya's largest mobile operator (MO). The application facilitates a variety of financial transactions through the mobile phone. This includes account balance checks, deposits and withdrawals, bill and merchant payments, airtime purchases, and money transfers (Hughes & Lonie, 2007; Vaughan, 2007). The growth of the application has been impressive. In July 2007, there were just over 268,000 registered users. Two years later, the number increased to 7.5 million, or 34% of the adult population.<sup>2</sup> This represents a growth rate of over 2,600%. Over 90% of these users are reported to be active. The frequency and value of transactions has also increased rapidly; the former by 4600% and the latter by 3700%. A cumulative value of over \$535 million USD has been transferred through the system since launch.

The significance of these figures is made clear when transaction volumes are compared against commercial bank deposits and GDP figures. In July 2007, the value of M-PESA transactions was about .2% of commercial bank deposits. In two years, this increased to 4.4%. In 2008, Kenya's GDP was estimated at US \$30 Billion. M-PESA transactions in the month of July 2008 accounted for US\$535 Million, or 2% of the year's GDP. Such rapid growth is illustrated in Table 1.

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<sup>1</sup> The term mobile money service is used here to describe the range of financial services that are offered via the mobile platform. A variety of other terms is used within the literature to describe these services. This includes m-banking, m-payments, m-transactions, and mobile financial services. For a summary of these terms see Donner (2007).

<sup>2</sup> According to the CIA (2010) 57% of 39 million of the population is over the age of 15. This means that just over 22 million of the population can be considered as adults. 7.5 million customers represents 34% of the adult population.

	<b>July 2007</b>	<b>July 2009</b>	<b>Increase</b>
Registered users	268,000	7,500,000	2,600%
Number of monthly transactions	354,000	16,700,000	4,600%
Value of M-PESA transactions to commercial bank deposits	.2%	4.4%	95%

**Table 1: M-PESA growth rates**

The growth of M-PESA has also surpassed most other technologies in the country. This even includes the mobile phone, which has been hailed as the fastest growing ICT in Africa. In the case of Kenya, the current subscriber base is just over 16 million. However, it took the MOs over a decade to reach this number. As is shown in Table 2, the internet and telephone growth rates have also been much slower. There are currently 3.36 million internet users in Kenya, and just over 252, 000 fixed line subscribers (CIA, 2010).

<b>ICT</b>	<b>Total Number</b>	<b>Per 100<sup>3</sup></b>
Mobile phone	16,000,000	41
M-PESA	7,500,000	19
Internet	3,360,000	9
Fixed line telephony	252,000	.8

**Table 2: ICT rates in Kenya for 2008-2009 (CIA, 2010)**

These rates are further impressive because they have exceeded those in Northern countries. Several mobile payment initiatives were launched in the early 2000s but very few of them have been successful. Gartner Group found that only 1% of all cellular users had mobile payment services in 2008 (Shen, 2009). However, they predicted that this number would increase to 3% by 2012. The report also predicted that the majority of the growth will be in Southern countries. Many mobile money services have been pulled off the market in Europe and North America mainly because they failed to attract a sufficient number of customers. The evidence of this is in the Electronic Payment Systems Observatory (ePSO) database.

<sup>3</sup> These figures are based on a population of 39 million.

The majority of the services that were listed in the early 2000s have since been discontinued (Rouibah, 2009). Such failures have been mainly attributed to security concerns and undefined areas in banking regulation (Shen, 2009). They have further been attributed to changes in “payment culture” across countries (Carr, 2008). Some also argue that there is less need for mobile money services within this context because of the well developed banking and payments infrastructure.

### ***1.1 The research questions***

Such rates of growth raise an interesting question, which will be the focus of this thesis. Why has M-PESA grown so quickly in Kenya? Such a question is especially important to examine because M-PESA provides a rare case of an ICT “failing” in the North and growing rapidly in the South. The case of M-PESA also challenges some of the assumptions that have been pervasive within the literature for decades. The first is that Africans are deficient in regards to their technological capabilities. The second is that a variety of interventions are required to facilitate ICT growth and foster “development”.

These assumptions are largely being perpetuated by the international development community. They constitute a larger discourse known as information communication technologies for development (ICTD). Organizations such as the United Nations Development Program (UNDP), International Telecommunications Union (ITU) and the World Bank have released numerous documents arguing that communication technologies can foster wide-scale social and economic improvements. These organizations argue that ICTs can be used to enhance learning, improve healthcare, empower the marginalized, promote indigenous knowledge and maintain good governance (Castells, 1999; Gilhooly & Lal, 2003; UNDP, 2001; Muswazi, 2001). Key phrases such as “information society”, “network age”, “digital divide”, and “information rich” are pervasive within the literature and used by the authors to elucidate the numerous benefits of ICTs. These phrases are also employed to provide the international community with an earnest warning—that if developing nations do not harness the power of communication technologies they will fall even further behind in their process of development.

Such organizations have also funneled a significant amount of cash into the cultivation and deployment of technology for development strategies. However, the outcomes of such strategies have been differential and often disappointing. There are several examples of ICTD “failures”. In some cases, the projects did not meet the developmental goals they were

implemented to address (Heeks, 2005). In others, the technologies were rejected or used in ways that were unintended by development practitioners. These failures have led some to argue that the majority of ICTs are not appropriate for resource poor communities and to suggest that money be funnelled into more pertinent areas instead (Sunden & Wicander, 2003; Ngwenyama & Morawczynski, 2009).

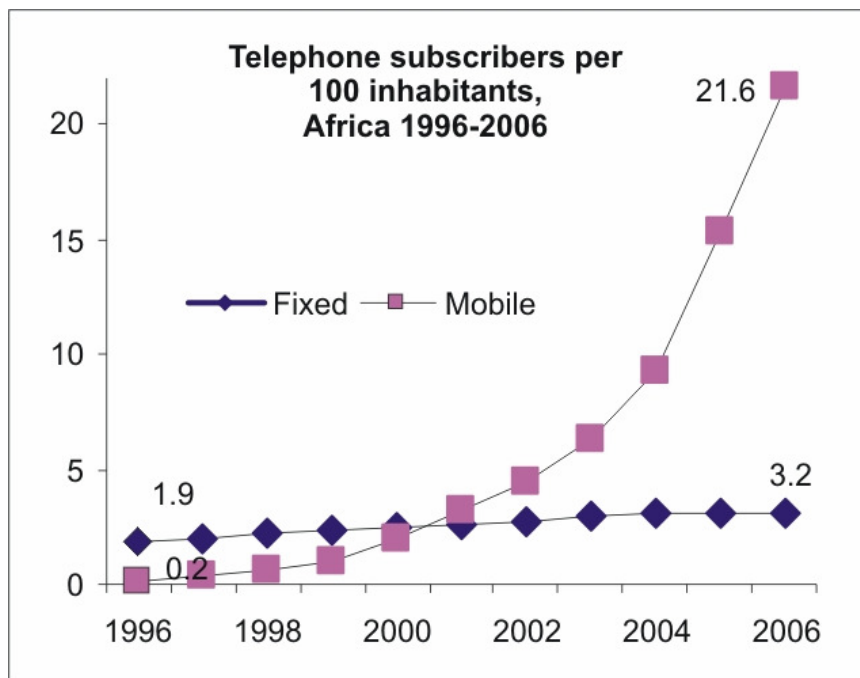
The case of M-PESA illustrates that ICTs can grow rapidly within resource poor communities without the help of development practitioners. Although the UK government provided the funding for the initial conceptualization, it was an MO that introduced the system into the market and instigated growth. As such, it can be argued that M-PESA warrants further investigation because it can reveal some valuable lessons to both Northern and Southern countries. In regards to the former, the analysis has already made clear that such applications have been less successful in Europe and North America. In regards to the latter, mobile money applications have also seen slow growth rates in other African countries. For example, South Africa's WIZZIT has managed to attract 250,000 customers in more than four years of operation. Neighbouring Tanzania launched its own version of M-PESA in April 2008, but it has only recently crossed the 100,000 customer mark (Mas & Morawczynski, 2009).

The question of why M-PESA has grown so quickly can be linked to a more general question—why do some ICTs grow in resource poor communities whilst others do not? The literature has produced various explanations for both growth and failure. These will be summarized in the next section.

## ***1.2 Examining the growth of ICTs in resource poor communities***

One of the earliest ICTs to penetrate the African market was the landline telephone. However, as is illustrated in Figure 1, the growth of this ICT has been slow. This is especially true if compared with the mobile phone. Much of the literature has pointed to the inefficiencies of the ICT sector across the continent and emphasized the infrastructure gap when explaining such stagnant growth. Rural areas are largely underserved. In urban areas, the quality of service has been noted to be low. A recent World Bank report made clear that countries in Sub-Saharan African experienced an average of 28 days of telephone outages (Calderon & Serven, 2008). There is also a significant delay in obtaining telephone service. The report also made clear that customers waited an average of 97 days for installation. Policymakers and regulators have mainly been blamed for these inefficiencies. When the

telephone was first introduced, many countries limited competition in the sector and endorsed a monopoly supply in fixed line telephony services. They did this to maximize the revenue from their state owned assets (Cohen & Southwood, 2004).



**Figure 1: Telephone Subscription Rates (ITU, n.d.)**

The literature has also made clear that pricing schemes are responsible for sluggish growth (Horst & Miller, 2006). In many cases, telephone services are too expensive for the majority of resource poor customers. High installation and maintenance costs accompany these services. Many also continue to operate on post paid billing schemes. This makes it difficult for those without credit histories to have a telephone. These inefficiencies are especially important to note because they have impeded the landline telephone from generating a network effect. This term is used within the economics and business literature to describe the effect that a user base can have on the value of the entire network (Liebowitz & Margolis, 1994; Saloner & Shepard, 1995). The general premise is that the value of the network expands in conjunction with the user base. In the context of various African communities the telephone is not considered a valuable service because resource poor are limited in their capacity to reach their social networks when using the technology. Even today, landline telephones are mainly in the homes of the wealthier Africans.

Infrastructural gaps have also been cited as a major reason for the slow rate of internet growth across the region. The most recent internet world statistics make clear that only 3.9% of the world's internet users are in Africa (Internet World Stats, 2009). This is interesting since nearly one fifth of the global population live on the continent. Besides infrastructure gaps, there have been other explanations for the slow growth rates. Some argue that low literacy rates impede many from accessing the service (Mwesige, 2004). Others make clear that the majority of the internet's content is produced in Northern countries (Mercer, 2006). As a result, it is not applicable to the daily needs of the resource poor.

But there have been some interesting cases of rapid internet growth in the South. The best example comes from Miller and Slater (2000) and their study of the internet in Trinidad. The authors made clear that the technology was rapidly adopted because the local population had a "natural affinity" for the technology. It fit effortlessly into family and friendship networks and was utilized for the maintenance of diasporic personal relations. These were important because they provided Trinidadians with both moral and economic support. The technology further fit into local forms of sociability. This includes styles of chatting and "hanging around". It also includes courting and the pursuit of sexual liaisons. In this case, the internet became a valuable technology because it allowed low-income users to reach existing contacts, both in Trinidad and abroad. It was thus able to generate a network effect.

Perhaps key growth factors can more easily be identified if ICTs that have been successful in the African context are examined. The mobile phone is a very obvious example and will be discussed below in more detail. But there is another ICT that predated the mobile and was also pervasive within many African communities—the talking drum (Aaron, 2003; Ong, 1977; Mushengyezi, 2003; de Bruijn, 2008). The technology was mainly used as a medium of mass communication over a distance. It was sounded to summon community members to an important meeting. It also announced important events such as the death of an elder or chief (Aaron, 2003). Each message was constituted by a specific set of rhythms. In most cases, community members were able to decode the message. They had learnt, both aurally and orally, these rhythms since childhood (Aaron, 2003).

In many communities across Africa, these drums were a permanent fixture in village life. They were suitable for communication to non-literate individuals. They further provided a cheap way for messages to be transmitted. The drums were also easy to maintain as expensive technical equipment and infrastructure was not required. Most interestingly, the

drums fit into local power structures. They were owned and controlled by the elders or other community leaders who acted as custodians of knowledge (Aaron, 2003). Those who needed to transmit socially important news had to ask these custodians to transmit the news on their behalf (Hahn & Kibora, 2008).

This latter point is especially important to understand because it makes clear that power structures can influence rates of technological adoption. This is revealed in an interesting study of mobile phones and talking drums in Burkina Faso (Hahn & Kibora, 2008). The authors made clear that mobiles were adopted by the community because their underlying structures of usage were similar to the talking drums. Following local tradition, it was the elders and community leaders who controlled the first phones in the village. As was the case with the drums, the person who needed to communicate would ask the owner of the instrument to transmit a message. Because the mobile phone did not initially disrupt the power structures associated with the talking drum, it was accepted in the village. However, this is probably no longer the case. The villagers most likely purchased their own mobiles as they became increasingly available and affordable. This probably allowed them to circumvent power structures and have greater control over processes of communication.

The mobile phone has also grown rapidly in other parts of Africa. The evidence suggests that billions of resource poor individuals are using their limited income to acquire handsets. They are also spending a significant portion of their income on the purchase of airtime credit. In fact, the research suggests that as household income increases spending on mobile phones grows faster than that on water, energy or anything else (“A Special Report”, 2009). There have been numerous explanations for why this is the case. Some studies note that supply side factors have instigated growth. In the past decade, handset prices have plunged as manufacturers have realized the opportunities of selling low-cost products at scale. In 1997, the average cost of a handset was \$250 USD. It is just \$20 today (“A Special Report”, 2009). Some have also argued that prepaid billing schemes have driven adoption (Horst & Miller, 2006; “A Special Report”, 2009). These allow individuals to purchase small denominations of airtime credit rather than paying a pre-determined monthly fee. They are particularly suitable to resource poor users because airtime expenditures can be adjusted to suit their erratic incomes.

Research further suggests that such pre-paid systems are beneficial for communities in which there is a structure of economic individualism. For example, an ethnographic study of the

mobile phone in Jamaica revealed that users believed the mobile to be cheaper, even though it was 17 times more expensive than the land-line (Horst & Miller, 2006). This is because the land-line relied on a collective rather than an individual system of billing. Such a system caused conflict within the household as members did not know how to divide the bill. The prepaid system made such costs easier to monitor and control.

Many studies have further argued that demand side factors are the major drivers of adoption. More specifically, they have proposed that the mobile became pervasive because it fit into the needs and habits of resource poor users. This point was also illustrated in the Horst and Miller study (2006). The authors found that the mobile was quickly adopted because it fit into a distinct form of Caribbean communication called “link-up”. This was characterized by frequent contact within a wide network of non-kin relations. Such a network was utilized for a variety of purposes—from sexual liaisons to the organization of church crusades. It also facilitated strategies of day to day survival. Over a third of the houses had no employment income and relied heavily on their social networks for support. Maintaining good relations that could be called upon in times of need was vitally important to coping strategies.

Sociability has also been noted as a key driver of adoption. For example, a study of micro-entrepreneurs in Rwanda found that nearly 2/3 of all calls were made to friends and family. In most cases, these contacts predated the phone (Donner, 2005). These social calls predominated even though the entrepreneurs had initially adopted the phone for “business purposes”. Another study of mobiles in Burkina Faso revealed that the technology was used mainly to keep in touch with relatives around the country (Hahn & Kibora, 2008). These calls were important because they saved the resource poor both time and money on the maintenance of these relations. They also acted as substitutes for home visits. Numerous other usages for the mobile phone have also been noted by the empirical studies. This includes the co-ordination of funerals, organization of remittances, trading of goods, solicitation of pricing information, the organization of crime, and the pursuit of romantic relationships (Molony, 2005; 2008; Goodman, 2005; Brinkham, de Bruijn & Bilal, 2009). From these diverse usages it can be argued that the mobile was rapidly adopted because it fit into the needs and practices of low-income users.

### ***1.3 Explaining the growth of M-PESA***

The analysis presented above raises an interesting question—which of aforementioned factors can best explain technological growth in resource poor communities? Is such growth



supply or demand driven? Do social or economic factors stimulate growth? The thesis will start from the premise that technological growth is extremely complex. As such, it is difficult to identify a few factors that drive this process. In the context of this thesis, ICT growth will be explained from two different perspectives—the systemic and the user. First, the socio-technical systems framework will be used to make clear that M-PESA is not just an application. It is a complex system that is constituted by a variety of inter-related elements. Using this approach, the research will show that M-PESA grew because it had a dedicated team of system engineers. These individuals took numerous strategies to enroll the elements and maintain the stability of the entire system. They further worked to engineer the social, economic, legal and political environments of the technology. The thesis will also show that M-PESA grew because it was subsumed by an extensive and powerful system—Safaricom. This system had already penetrated the daily lives of users. As such, it acted as a vital platform for the permeation of M-PESA.

Growth will also be explained from the perspective of the user. The thesis will make clear that M-PESA was widely adopted because it fit into existing social practices and systems of logic. In other words, it helped users to do what they were doing before the technology was introduced. This includes money transfers back home. It also includes savings. Such findings will be used to substantiate some of the literature mentioned above. For example, the thesis will make clear that sociability was a vital driver of growth. It will also show that M-PESA was adopted because it fit into local power structures. The analysis will also go one step further and contextualize the technological activity within a wider structure of debt and obligation called entrustment. Such contextualization will elucidate the importance of technological activity within the social order.

Attention will also be given to some unique events that instigated growth. The most significant was the post-election violence. During this period, physical flows of money were impeded because of road blocks. As a result, many began to depend heavily on M-PESA to cope with, and escape the threat of, ethnic violence. The recurrent shocks that followed the violence also increased the need for rapid and affordable money transfer. Because M-PESA was able to facilitate such transfers it became an indispensable element in the everyday lives of Kenyans.

## ***1.4 Discussing outcomes***

The discussion of growth is necessary because it sets the context for the second part of the investigation. This examines the consequences that emerged from usage and makes clear how daily life changed because of the integration of M-PESA. Such a discussion is presented in two parts. The first will make clear that technological practices began to change with increased usage. This occurred because M-PESA was utilized for the cultivation of livelihood strategies. It helped users to prepare for, and react to, the shocks and trends that emerged within their environment. It also occurred because the application lessened the effort required to make a transaction. For example, users could send money at anytime and from anywhere as long as they maintained a balance on their account.

Secondly, the thesis will highlight the various outcomes that emerged from changing practices. It will link the outcomes to particular types of usage. For example, it will show that remittance usages facilitated rising household income. It will also show that savings usages facilitated consumption smoothing during shocks. The thesis will also make clear that the outcomes were both contradictory and unexpected. For example, M-PESA both challenged and reinforced power structures within the household. It also increased and decreased the income levels of users. This discussion of outcomes is vitally important. To date, there are very few studies that detail the consequences of technological penetration on the daily lives of users. Much of the literature has made an inextricable link between ICT permeation and “development”. It has presented technology as both a sign, and reward for human ingenuity and progress. This thesis will make clear that the relationship between ICT penetration and development is not so straightforward and simple. A variety of factors, from the nature of gender relations to the structure of debt and obligation, shape the types of outcomes that emerge.

The thesis will further use a measure of impact that is unique to the ICTD literature. Much of this literature focuses on, and looks for, epidemic change. That is, change which impacts nearly every facet of daily life. This includes modes of consumption, labour relations and even culture. However, it often fails to make clear the very specific set of transformations that constitute this meta-change. This thesis will discuss these transformations and highlight their historical and contextual contingencies. It will further explain that the relationship between technologies and impact is complex as a result. The Outcome Mapping Framework (OMF) will be used to present these consequences (Earl et al., 2001). This framework makes a distinction between outcomes and impact. It defines the former as the incremental and

subtle changes that occur because of particular interventions. It presents the latter as wider scale transformations that impact various facets of daily life. The framework puts its focus on outcomes. It makes clear that such outcomes are important to understand because they constitute and drive the wider scale transformations. As a result, they can function as predictors of meta-change that is looming. The thesis will identify several outcomes that emerged in the daily lives of Kenyans as a result of adoption and usage. It will also put attention to the impacts that started to manifest during the fieldwork. For example, it will discuss how the structure of urban-rural dependencies started to change. The thesis will also describe that the success of M-PESA spurred the growth of an entire industry for mobile money.

The work will also make a contribution to the STS literature in general, and domestication theory in particular (Levold, 2001; Silverston & Hirsch, 1992; Sorenson, 1994; 2006). The majority of this literature has examined this process in Northern countries. For example, researchers have looked at domestication in the home, lab, classroom and internet café. This research will present a unique case of this process in a Kenyan informal settlement and village. These unique settings will reveal factors that impact such a process but have received little attention within the literature. This includes unexpected events like political violence. It further includes the structure of households and urban-rural relations. The work will also suggest that domestication theory should draw more heavily from the anthropology of technology and practice theory literature. Such literature also recognizes the co-constructive processes that shape the trajectory of technological development. However, it focuses its attention on technological practices. It further contextualizes such practices within a broader structure of activity. By doing so, it makes the relationship between technological usage and outcomes a bit more clear. More specifically, it shows that the technology itself does not engender the outcomes. It does, however, have a role in shaping the practices that do.

### ***1.5 The context of investigation***

The empirical data on which this analysis is based was collected in two sites. The first is Kibera, an informal settlement on the outskirts of Nairobi. This area is home to over 1 million individuals. The majority are urban migrants who come from their natal villages to find work. The second site was found after the “money trail” was followed. It was a small village in Western Kenya called Bukura. The majority of residents within this context were subsistence farmers. Many had relations in Kibera, or other urban centres. Two types of

users were identified within these two sites. The first were the urban migrants in Bukura. They were the early adopters of M-PESA and often used the application to send money home. This class of users tended to be better educated, younger and male. The second class of users were the rural dwellers. A large portion of this segment depended on subsistence farming for their livelihoods. They often used M-PESA to receive cash from their urban contacts.

The data was collected over a period of fourteen months (September 2007-December of 2008). A variety of ethnographic methods were used during the fieldwork. This includes semi-structured interviews and participant observation. It also includes focus groups and financial diaries. It must be noted that the research was carried out in the context of wide-scale political violence, which erupted as a result of the December 2007 elections. As will be made clear in this work, this event shaped both the research process and outcomes. The research examined both the technology and community in which it exists. This facilitated an understanding of the dynamic relationship between technology, the user, and their practices. It also revealed the various struggles that occurred within the two contexts because M-PESA was integrated into the daily lives of the users. The work will further make clear that M-PESA became very different things not only across space but also time. In some instances it was used for the maintenance of urban-rural relations. In others, it was used to cope with unexpected shocks and trends. Each one of these usage practices had a very different set of outcomes.

### ***1.6 Organization of the thesis***

The thesis will proceed as follows. **Chapter 2** will make clear the methods that were used to collect the data. It will also discuss some of the factors that shaped the fieldwork encounter and research outcomes. This includes the gate-keepers, language barriers and relations with informants. The chapter will further provide a more detailed description of the two research sites. The numerous events that shaped daily life in these contexts will also be discussed. Particular attention will be given to the post election violence, which impacted both the research process and the daily lives of the informants.

**Chapter 3** will employ the socio-technical systems framework to explain the growth of M-PESA. It will identify the diverse elements that constitute the M-PESA system—from agents to the user interface (UI). It will also identify the system engineers and make clear the various strategies taken to protect the system against hostile external forces. The factors that

operated in the system's environment and shaped growth are also discussed. This includes banking regulation and the uneven structure of the economy. It also includes the telecommunications sector and the informal nature of employment. Attention is also given to the influence of other systems in the environment. As was mentioned above, M-PESA was subsumed under Safaricom. This over-arching system provided a vital platform for growth.

**Chapter 4** emphasizes other elements that are vital to growth but have not been given the appropriate amount of attention within the systems literature. This includes the user, and non-user. It also includes the practices that emerge from, and are shaped by, the socio-technical system and its environment. The chapter argues that M-PESA grew rapidly because the technical features fit into the local practices and systems of logic. It also shows that such practices were maintained because they had meaning within the social structure. For example, the act of sending money had not only practical but also symbolic value. With each money transfer, the urban migrant was sending an important message—that they had not forgotten their obligation to the village whilst residing in the city. The analysis contextualizes remittance practices within a larger structure of borrowing and lending called entrustment. When manifested in action, entrustment was characterized by an extensive network of exchanges that were made in both cash and kind. Remittance transfers were just one part of this extensive network.

**Chapter 5** continues this discussion by making clear that financial practices began to change with increased usage. This occurred because M-PESA became implicated into the livelihood strategies of resource poor users. This was especially the case in rural areas. During shocks like the hunger season it allowed farmers to solicit cash from a wide network of city contacts. The chapter also gives attention to changing savings practices. It makes clear that users increased the number of savings transactions after integrating M-PESA into their savings portfolios. This resulted in a decrease in the number of transactions made with the other mechanisms, the home bank and bank in particular. M-PESA also facilitated the accumulation of “secret savings” because it rendered financial transactions and wealth less visible. The chapter also identifies two classes of intermediaries that facilitated changing practices—the agents and the local experts. It makes clear that these intermediaries took a variety of strategies to expand the user base and increase the number of M-PESA transactions.

**Chapter 6** presents the final argument in the thesis. That is, increased usage engendered a variety of outcomes in the daily lives of both the users and non-users. For example, it shows that the frequency and value of transfers went up when M-PESA was used to send money home. It also shows that it facilitated consumption smoothing when used for savings. The discussion will also make clear that not all outcomes engendered by usage were positive. As was made clear above, some were unintended whilst others were contradictory. The OMF will be used to frame the discussion of outcomes. Such a framework is particularly useful because it pays attention to the short term transformations that are engendered because of increased usage. It can also be used to predict the longer term impacts that are looming.

Finally, **Chapter 7** reiterates the main arguments of the thesis. It also makes clear the contributions of the work to various strands of literature. This includes the ICTD, mobiles for development (M4D), domestication literature, and the branchless banking debate.

## **Chapter 2: Methodology**

### ***2.0 Introduction***

The chapter will delineate the entire research experience—from the choice of topic to the exit from the field. Particular attention will be paid to both the personal and methodological challenges faced during various stages of the fieldwork. It will reveal stories of car-jackings, muggings, riots, language barriers, and violent encounters with coke bottles. It will start from the premise that the decisions made in the field impact the final research outcomes. Thus, before the outcomes are revealed, such decisions need to be made clear. It further starts from the premise that all researchers are connected to their object of study. As a result, it is vital to analyze the degree to which the empirical findings are artefacts of the researcher's presence. It is also important to consider the validity or accuracy of the research outcomes and make clear the extent to which the conclusions reflect empirical reality. This can be achieved more easily if the researcher reflects on their positionality in the field, and understands the degree to which their presence has influenced the research process.

The methods appropriated and sites chosen for the deployment of their fieldwork also impact the research outcomes. This chapter will introduce the two research sites—Kibera and Bukura—and make clear how and why these sites were chosen. The variety of methods used to collect the data will also be discussed and their complementary nature explained. Such a discussion will set the context for the presentation of the empirical findings.

### ***2.1 Choosing the topic***

The author has been involved in the ICTD research for several years before starting the PhD. She was hired as a research assistant during the final year of the undergraduate. Her role was to investigate the impact of ICTs on human development using regression analysis tools. As she became more familiar with the literature, she began to notice significant gaps. The first was related to how impact was measured. The majority of studies used aggregate measures, such as GDP, to make their arguments regarding impact. Very few analyzed impact at the micro-level, and could explain how daily life changed as a result of innovation. Furthermore, the majority of the studies focused on economic aspects of impact. Very few detailed the social changes that were generated through adoption and usage.

Her interest in the impact of technologies continued into her Master's year. Her thesis advisor was well aware of this interest and suggested that she write about the mechanical

clock. He considered this technology to be the most “transformative” in African history. The author soon discovered that he was right. The mechanical clock had a profound impact on conceptualizations and experiences of time. It also had an impact on local practices, which began to change as individuals adjusted to the regime of clock time. Such changing practices engendered numerous important social implications, such as conflict within the household and increased tension between community members. By the time she had finished the dissertation, she realized that social impact could be grasped through an examination of changing practices.

The author started a PhD in Edinburgh with an idea of how she could contribute to the literature. That is, she would measure social impact through an analysis of changing practices. With this goal in mind, she began to search for a technology to investigate and a site in which the study could be conducted. Initially, she chose the mobile phone. However, a meeting with BBC journalist Paul Mason quickly changed the trajectory of the research. She met Paul to discuss his documentary, which examined the impact of mobile phones in Kenya (Mason, 2007). At that meeting, she first heard about M-PESA. Paul explained how the application worked. He then predicted it would be the next “big thing in development”, and suggested that she study M-PESA instead of the mobile phone. The author took his advice. She left that meeting with a new enthusiasm, and new topic for her PhD research. Paul was right in his prediction. M-PESA has received a significant amount of attention from both the media and the international development community and has become a “big thing in development”. Perhaps this could be a good lesson to other PhD students—it is always best to consult journalists when choosing a topic.

## ***2.2 Research timeline***

After meeting with Paul, the author spent time reviewing various bodies of literature and preparing a proposal for the board examination. She also made arrangements for Kenya, and began to make contacts in the field. The author had prepared a schedule before beginning the research, and allocated the first six months to language training. She started Kiswahili lessons with a private tutor a few days after arriving to Kenya. She spent four hours a day, five days a week, learning the language. Eventually, however, boredom and curiosity got the better of her and she decreased the time spent on language training. She began to look for a fieldwork site, and by early October was in Kibera collecting data.

During the early stages of the fieldwork, the author would visit Kibera two or three times per week. However, the frequency of visits increased as the fieldwork progressed. By the end,



she was visiting the informal settlement on a daily basis. In mid-March of 2008, she began the fieldwork in Bukura. As will be described below, the post-election violence constrained access to Kibera. The author split her time between Bukura and Kibera for the remainder of the fieldwork. Usually, she would spend two weeks to a month in each site.<sup>4</sup> In between the visits she would step out of the field to write-up the fieldnotes, analyze the data collected, and plan on what to investigate next. By December of 2008, the author felt confident that she had collected enough data and returned to Edinburgh. She spent the next year writing up the thesis. She also prepared the findings for publication in peer-reviewed journals. The papers that emerged out of this work are attached to the thesis. The timeline for the research project is presented in Table 3.

<b>Date</b>	<b>Location</b>	<b>Task</b>
September 2006-August 2007	Edinburgh	Board Paper
September 2007-December 2008	Nairobi	Language training and fieldwork
January 2008-December 2009	Edinburgh	Writing-up dissertation, preparing findings for publication

**Table 3: Research Timeline**

### ***2.3 From informal settlement to “shamba”: The multi-sited ethnography in the multi-spatial household***

To gather the data, the author conducted a multi-sited ethnography. As mentioned above, the research aimed to understand the social impact of M-PESA on daily life through an analysis of changing practices. Thus, one of the first aims of the research was to understand daily life itself. This includes everything from financial habits, social relations, structures of households, and kin networks. The author chose to employ ethnographic methods. She believed that an understanding of daily life could best be grasped through intensive fieldwork and deep immersion over an extended period of time. She was further influenced by a variety of ethnographic studies within her own discipline (Latour, 1993; Cooper, et al., 1995; Latour, 1996; Downey & Dumit, 1998). Such studies used intensive fieldwork methods to show how cultural meanings and power relations were embedded in technology. They further focused on the agency of technology to shape human practice.

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<sup>4</sup> See appendix A for a more detailed schedule of the research.

The multi-sited approach was chosen after the author acquired a better understanding of the household structure in Kenya. She soon discovered that many families were split. The men worked in the city. Their wives, children, and extended relations remained in the village. Other work has also found that this type of living arrangement is common in Kenya. Agesa (2004) estimates that over one third of families are split between urban centres and rural areas. The result of this arrangement is a two-way flow of resources and reciprocal relationships (Ross & Weisner, 1977; Owuor, 2005; Owuor, 2006). To fully grasp the dynamics of this arrangement, some researchers have engaged in a study of the household across space (Owuor, 2005; Owuor, 2006). They have argued that social and economic life in Kenya cannot be analyzed as two discrete systems but as one social field. This is because migrants seek to maximize relations in both areas. The term “multi-spatial household” has been used to describe the distinct nature of the Kenyan household. This will be described in more detail in Chapter 4. This approach was adopted in the research and the money trails were followed from Kibera. These led to several villages in Western Kenya. One of these was Bukura, the second site for research. Through the multi-spatial ethnographic approach, the multi-directional flows of money and goods were captured between these two locations. Effort was also made to examine why these flows exist, and how they began to change with increased M-PESA usage.

## ***2.4 Gaining access to the sites***

Accessibility was one of the major determinants for the choice of sites. As was mentioned above, the author first visited Kibera in early October of 2007. She gained access to the site through a youth organization called the Kibera Community Youth Program (KCYP). This organization provided tours around the informal settlement for a small fee. She was put in touch with Richard, one of the co-founders, and they arranged to meet for a tour the next day. Richard knew the informal settlement well. He had moved there with his Mother as a child. Richard led the author through the congested streets, and narrow alleyways of Kibera. He seemed to know every section of the informal settlement. He also seemed to know many of the residents. The author immediately took a liking to both Richard and Kibera. She offered him a job as a research assistant. He accepted and acted as a vital gate-keeper for the duration of the research. He made it much easier to contact informants and solicit information. Numerous interviews were conducted in the homes of his neighbours, friends and relatives.

Richard also led the author to Bukura, his rural home. He had many relations in this area. She stayed in the home of his Uncle Robert and Aunt Jennifer throughout the research. Both

Robert and Jennifer were farmers. They lived on two acres of land with their seven children and *nyanya* (Robert's Mother). Robert was born, and grew up in Bukura. Jennifer moved to the area after marriage. The couple was known in the community for their involvement in the local church. Jennifer also organized a variety of local savings groups. The house was always busy with visitors. Robert and Jennifer acted as vital gate-keepers in Bukura. They spent hours taking the author around the village and introducing her to relatives and friends. Eventually, these contacts acted as informants.

The author also needed to gain access to the agents. She thus approached the head of M-PESA and asked for a letter, which introduced her as a researcher from the University of Edinburgh. The head of M-PESA agreed. Although this facilitated access to the agents, it also resulted in some new challenges. Many of the agents thought that the author was associated with Safaricom. As a result, they would provide her with lengthy accounts of the problems they faced with M-PESA. They would then request that she "pass on messages to head office". The following fieldwork excerpt reveals how an agent having a problem in Kibera tried to solicit help from the author:

I was standing outside when Isaac [agent] called me over. He began to explain that he had "made a bad mistake". He deposited money into the wrong account and needed to reverse the transaction. He continued that it would take him hours if he went through customer care...He then asked me to "call my people at Safaricom" to take care of the problem. I began to explain to Isaac that I did not know anyone at customer care. He was silent for a moment before asking me why I was not willing to help him.

Such incidents occurred on numerous occasions. It took almost three months for the agents to believe that the author did not work for Safaricom. After they were convinced that she was independent from the company, the discussions became much more informal. The agents revealed humorous stories about their interaction with the customers. They would also complain about the other agents. This provided the author with vital insights into the daily lives of the agents. Many customers also thought that she worked for Safaricom. They, in turn, would ask her to forward complaints about the agents to head office. Many were disappointed when she told them that she could not meet their request.

The fact that the informants believed that the author worked for Safaricom facilitated initial contact. It also affected the type of data that she was able to collect, especially during the beginning stages of the research. Many of the informants were reluctant to answer questions that did not relate to M-PESA. They did not understand why they were being questioned about their financial habits or relations with their relatives. As a result, the author had to

spend a considerable amount of time building rapport with informants. This will be described in more detail below.

## **2.5 From Kibera to Bukura: Following the money trail**

As mentioned above, the research began in Kibera. The author had seen a variety of other communities, in and around Nairobi. However, she chose Kibera because it was made accessible through Richard. She also chose the site because of the under-representation of financial services. This allowed her to examine how M-PESA fit into, and began to alter, informal financial practices.



Kibera is situated close to the city centre and covers about 2.5 km<sup>2</sup> of land. Over 1 million people reside in Kibera in mud walled houses with iron sheet roofs. Although the informal settlement is ethnically diverse, the majority of the residents belong to the Luo or Luhya ethnic group (Macharia, 1992; Ishihara, 2003). Most migrate from villages in Western Kenya, usually Western or Nyanza province, where it is difficult to find work.

**Figure 2: Map of Kenya (CIA Factbook)**

When first arriving in Kibera, many migrants receive support from networks of home people. This includes relatives, neighbours and friends from their rural village. These contacts will house and feed the migrants until they are able to sustain themselves.

Many migrants find employment as casual labourers or in the informal sector. They work as welders, carpenters, tailors, or hawkers within Kibera (King, 1996a; King, 1996b; King, 2001). Some managed to find employment outside Kibera, working as security guards or house help in the city centre or sprawling suburbs of Nairobi. These informal, or casual jobs, provide migrants with little job security. As such, it is common for them to move

between Kibera and their rural home—returning when they can no longer afford to live in the city (Ishihara, 2003).

Almost all residents in Kibera are tenants. One reason for this is the precarious land rights in the informal settlement. The land on which Kibera sits is officially owned by the government. As such, it cannot be bought and sold. Landlords in Kibera are often referred to as “structure owners” because they have no legal rights to the land on which they build and rent out their dwellings (Ishihara, 2003; Huchzermeyer, 2008; Joireman & Sweet, 2008). Most of these structures cannot be easily purchased as structure owners make a significant profit from their rental. In fact, Kibera is reported to be the most profitable place in Nairobi to rent out property (Joireman & Sweet, 2008). Because of their inability to own property many of the migrants will frequently move within, as well as in and out of, the informal settlement throughout their working lives (Ishihara, 2003).

The social amenities in Kibera are poor. The majority of dwellers do not have electricity. During the evenings the informal settlement becomes engulfed in darkness and, because of the security risks, some residents choose to stay indoors. Power supplies only exist along the main roads and railway track. Businesses requiring power must locate themselves in these locations. These power sources are unreliable and cuts are a frequent occurrence for those with electricity. There is also very little police presence in Kibera. Some residents report that the police only come into the informal settlement when they want to collect bribes. As a result, residents will often handle disputes amongst themselves or consult locally appointed chiefs. The poor quality of social amenities is again related to land ownership. The rights of the slum dwellers are precarious because they are considered to be illegal squatters by the Kenyan government. Even as the population grows and living standards deteriorate, the government has done very little to improve the conditions of the residents. They argue that many of the residents do not pay taxes and thus should not receive such amenities.

There are no formal financial institutions within Kibera. The residents must travel outside Kibera to access the banks and money transfer services. The under-representation of these organizations could be explained by the lack of security. As mentioned here, there is very little police presence within the informal settlement. There are, however, nearly forty M-PESA agents scattered around Kibera. All of these shops were visited at least once throughout the research. A cluster of 6 shops were visited at least once per month. The majority of time was spent in one shop called Eva’s Impressions. The shop is located in Kibera drive, the main entry way into the informal settlement. It has been opened since 2006 and sells a variety of Safaricom products including scratch cards, SIM cards and mobile

phones. The shop started offering M-PESA services in June of 2007. Because of its location, it was one of the busiest in Kibera. Usually, there were two agents working in Eva's. They were sent to the shop by the head office, which was located in a posh neighbourhood in Nairobi. None of the agents were residents of the informal settlement.

Many of the urban migrants interviewed confirmed that they came to Kibera from Western Kenya. A segment of these interviewees noted that their rural home was in, or around, Butere-Mumias district. The district is about 50 km away from Kisumu (see map above). They also noted that several agents were offering M-PESA services in the area. After a visit to this area, a village called Bukura was chosen as the second site. Again, this site was chosen because it was made accessible through Richard and his family. It was also chosen because the urban-rural linkages between the two sites were strong. Many residents in Bukura had relatives in Kibera. This explains the aforementioned money trail.

Bukura has a population of just over 20,000 residents and covers 30 km<sup>2</sup>. Kakamega, the nearest town, is situated over 20 km away from Bukura. The majority of the residents belong to the Luhya ethnic group. This group is composed of about 17 major sub-tribes in Kenya and four in Uganda. Each of these tribes speaks its own dialect of Luhya, and has its common customs and background (Osogo, 1966; Osogo, 1968).

Most of the residents in Bukura are subsistence farmers. They grow a variety of crops for domestic consumption. This includes maize, kale, beans, and finger millet. Some also grow cash crops such as sunflower or sugar cane. Most farmers own, or have claim to, one to five acres of land. Usually, men inherit such land from their father while women move to their husband's home upon marriage. As a result, most males live amongst their patrilineal kin. The Luhya also practice polygamy and several of the male informants had more than one wife. This also had an impact on household structure. Each of these wives was given their own hut. Married men would not have their own dwelling. Rather, they would move between the huts of their wives. In most cases, they would try to divide their time equally between the women to avoid problems.

There are very few opportunities for employment within and around Bukura. To make extra money, female residents would sell their crops on the local market. A few noted that they would travel into Kakamega to sell their goods. However, most said that they were constrained from making such trips because of the high transport costs. A return trip to

Kakamega via *matatu* (shared taxi), the most popular form of transport, cost 200 KES.<sup>5</sup> This price usually increased at peak travel times. Some of the men found employment as *boda boda* (bicycle taxi) boys. The earnings associated with these jobs were, however, low. Informants asserted to make 50-100 KES on an average work day. A few of the informants explained that they were formally employed. Some worked as teachers in the local schools. Others worked as public servants in nearby government offices. Many of the rural households noted that employment opportunities were limited in Bukura. As such, they depended on remittances from urban areas like Kibera for their livelihoods. In some cases, these remittances constituted a substantial part of household income. This will be described in more detail in the empirical findings.

There are no formal financial institutions within Bukura. As such, many of the villagers do not have a bank account. Money transfer services, however, are available within the village centre. There is a PostaPay, the money transfer service offered by the Post Office. There is also a local bus company called Musamaria, which passes through Bukura from Nairobi. The company carries envelopes, stuffed with cash, for a small fee. However, many residents asserted that these methods were inefficient. PostaPay had frequent cash shortages. Musamaria drivers would not hand the money over without a bribe. Some of the residents preferred to travel into Kakamega town to retrieve their money from the larger bus companies.

There is also an M-PESA agent in the centre of Bukura. It is located in a small shop called Flomu Communications. The shop sells Safaricom products and a variety of household goods such as sugar, maize flour and soap. It was owned by a local business man called Bernard. His wife and other relatives help in the daily operations of Flomu, and worked as agents. The shop served not only Bukura, but also neighbouring villages. As a result, it was one of the busiest in the district. Although other shops were visited in the area, the majority of time was spent in Flomu.

Time was also spent in other sites in Western Kenya. This includes rural villages, which had M-PESA agents. It also includes towns such as Kakamega and Eldoret. These sites were visited during the post-election crises. Kibera was not accessible during this period because of the ongoing violence within the informal settlement. Through such visits, the author was able to capture and understand the changes to remittance patterns that were instigated by the

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<sup>5</sup> In March of 2009, the exchange rate was 1 GBP = 114.448 KES. As such, 200 KES was worth £1.75 GBP.

violence and monitor similarities in adoption and usage patterns across contexts. She was also able to integrate a wider network of agents into the analysis.

## **2.6 Research methods**

As was made clear in the introduction, a variety of research methods were used to collect the data. These were chosen because they reinforced each other. For example, the participant observation and individual interviews allowed for the collection of vital information on the financial habits of the participants. These findings were confirmed through the financial diaries. The diaries also provided a quantitative data set for the analysis. This was useful for a closer examination of financial habits. The lexicon groups captured local meanings. This helped the author to gauge the place and importance of money and financial habits in the daily lives of low income informants. The various methods mentioned here will be discussed in more detail below.

### **2.61 Participant observation and interviews (unstructured and semi-structured)**

In the early stages of the research, participant observation and semi-structured interviews were used to collect the data. The author spent a significant amount of time in the M-PESA shops speaking to, and observing, customers and agents. The goal at this early stage was to identify the user base and begin to monitor usage patterns. After such an understanding was gained, the focus shifted to understanding the daily lives of informants by becoming immersed in it. Time was spent in households, churches, local markets and shops. This allowed the author to gather some vital information regarding contextually relevant meanings and practices. Particular attention was paid to monitoring the interaction between the informants in the two research sites. Through such interaction, the author was able to understand the nature of familial ties, division of labour within the household, gender relations and power structures within the community. She was further able to confirm, or in some cases prove invalid, information gathered through the interviews.

Over 350 interviews were conducted during the fourteen months. The duration of these interviews varied. Some spanned a few minutes, whilst others took several hours. In several cases, the informants were interviewed more than once. The majority of interviews in Kibera were conducted in English and Kiswahili. Initially, the author attempted to conduct these interviews alone. However, she faced numerous barriers in the process and decided to depend on Richard as a translator. Although undergoing language training, there were still some Kiswahili words and phrases that she did not understand. Furthermore, many of the



younger residents reverted to *sheng* during the interviews. This is a distinct form of slang in Nairobi, which is composed of English and Kiswahili as well as a variety of tribal languages (Githiora, 2002). This sometimes resulted in significant communication barriers. In Bukura, many of the informants only spoke the local dialect of Kiluhya. Because of these circumstances, Richard acted as a translator in both sites. He also faced some language barriers during the research. This occurred when interviews were conducted with Luhya informants outside of his ancestral village. As mentioned above, each of the sub-tribes speaks its own dialect of Kiluhya. There was thus significant linguistic variation in the area. As a result, local interpreters were employed to facilitate the interviews.

The inability of the author to interact directly with some informants affected the information that she was able to access, and the interpretations that she was able to make. This is one of the greatest weaknesses of the research. There was a high dependency on interpreters. As such, several measures were taken to ensure the reliability of interpretations. One such measure, which was suggested by Borchgrevink (2003), was to train interpreters throughout the fieldwork. Before each interview, the author would make clear to her interpreter the type of information that would be gathered during the interviews. The responses were also discussed after the interview was finished. There was a particular focus on exposing difficulties in translation. In Bukura, the author spent some time learning Kiluhya. She made a list of key words related to the research. Before the evening meal, Robert would help her to translate some of these words. This helped the author to understand segments of the interview.

A series of semi-structured interviews was also conducted with other key informants outside of the research sites. For example, the author met regularly with Pauline Vaughan, the head of M-PESA. Pauline acted as a vital gate-keeper during the research process. As mentioned above, she provided a letter that facilitated access to both agents and customers. Pauline provided updates on the recent developments of M-PESA during the numerous lunch and coffee sessions. Numerous other individuals who were involved in the early development of M-PESA were also interviewed. This includes Nick Hughes, who was responsible for the conceptualization of M-PESA. It also includes Susie Lonie who was involved in the pilot of the application. Through these interviews, valuable information was gained regarding the conceptualization, development and promotion of M-PESA. The list of informants is provided in Appendix B.

## **2.62 Group interviews**

Twenty one group interviews were conducted during the research. Some of the groups had a specific purpose. For example, the lexicon groups in Kibera aimed at capturing the local meanings of terms associated with this research. Participants were presented with the word, which was written on a small card. They were then asked to provide a definition. The negotiations and explanations that resulted from the lexicon groups revealed how these terms were understood by different community members. It also provided the author with a historical context for many of these concepts. For a full list of the terms used in the groups, see Appendix C.

Other groups were organized to understand the various facets of social and economic life. For example, *boda boda* boys were interviewed in Bukura. All of these young men were return migrants. They had once lived in Kibera or other urban communities. These group discussions revealed the problems associated with urban life. Rural women were also interviewed in Bukura. Some of the groups were composed of women receiving regular remittances; others were composed by those who did not. Such groups were useful in revealing that remittances were vitally important for rural livelihoods. They also revealed the tensions that existed between the male migrants and their rural wives. In many cases, disagreements about money engendered these tensions.

Attention was given to the composition of the groups. Some groups were composed of similar individuals who shared a common frame of reference. This allowed for the identification of key concerns. It further revealed viewpoints that were not expressed in the individual interviews. For example, the women exposed more about their relationships with their husbands when interacting with the other female group members. Usually, the women would compare stories of abuse and neglect. In some groups, the membership was diverse. Men and women of different age groups were represented. Such composition had a purpose—to instigate debate and capture a variety of perspectives on a single topic. The lexicon group is one example of such a mixed group. As mentioned above, the negotiations occurring in this group provided vital insights into the variations in local meanings. The full list of the groups is provided in Appendix D.

## **2.63 The financial diaries**

As mentioned above, the research aimed to delineate outcomes through an analysis of changing practices. The financial diaries was one method used to capture such practices. These diaries were handed out to fifteen participants. Eight were completed by urban

migrants in Kibera, the other seven by their wives in rural Kenya. As will be described below, this sample was chosen to explore financial practices within the multi-spatial household. Participants were asked to make daily entries detailing anytime that money came into, or left, their hands. Such entries were made for the period of one month. This provided insight into the daily financial practices of both urban and rural informants. It also showed how M-PESA fit into, and altered, these practices. An example of a diary is given in Table 4:

	<b>Money In</b>		<b>Money Out</b>	
Sep-02	Wage from salary	6000	Bread	34
	Sold a radio	2000	Tea	50
	Merry go round	200	Cow peas	10
	Gift from sister	500	Tomatoes	10
			Onions	5
			Banana	50
			Beans	80
			Fat	20
			Meat	60
			Salt	10
			Paraffin	50
			House rent	1000
			Send to wife through M-PESA	1500
			Phone credit	100
			Home bank	5721
	<b>Total</b>	<b>8700</b>		<b>8700</b>

**Table 4: Financial Diary Format**

This entry is taken from the diary of Lawrence, a painter in Kibera. Like the other participants, Lawrence has a variety of items constituting his income inflows. This includes his wage, the sale of a good, a savings group, and a gift from his sister. He also has a variety of uses for the money acquired. Some of the cash is spent on household consumption items, some is remitted back home, and the majority is saved in his home bank. The total money

inflows and outflows in Lawrence's diary are balanced. All participants were asked to maintain such a balance. This facilitated the analysis of savings patterns. It also encouraged participants to record the full range of financial transactions that constituted daily life.

Two in-depth interviews were conducted with the participants. The first was held before the diaries were handed out. Participants were questioned about their background during this interview. This includes nature of employment, structure of household, and affiliation to financial organizations. The second was conducted after the diaries were collected and analyzed. During this interview concerns and questions regarding the entries were addressed. Participants were also asked to attend weekly meetings. Diaries were monitored during these meetings, and any missing or duplicate entries were discussed. The meetings were also held to motivate participants to continue making the entries. Although twenty-five diaries were handed out, only fifteen were used in the final analysis. Some of the participants dropped out because they found the diaries too time consuming. Others were asked to leave either because they had incomplete diaries or because they failed to attend the weekly meetings. Compensation was provided. More specifically, 1000 KES was given to those that had completed the diary. Measures to ensure the accuracy of the entries were also taken. For example, participants were asked to keep their M-PESA SMS confirmation receipts. This allowed for the cross-checking of entries.

The financial diaries methodology used here differs from that of Rutherford (2002), Ruthven (2002) and Collins (2005). In these studies participants were not given diaries in which they made entries. Instead they were interviewed, usually on a bi-weekly basis, for the period of one year. They were asked to describe their monetary inflows and outflows during these interviews. This method is best suited to the analysis of financial patterns over a longer period of time. It is less appropriate, however, for capturing daily financial practices and monitoring changes in these practices. The aforementioned studies also focused on capturing financial practices within the household. In their case, the household was conceived of as a spatial unit. Such an analysis would not be suitable in the Kenyan context. As mentioned above, many households are organized across space. To capture these multi-spatial ties flows, the diaries were first given out to urban migrants who use M-PESA to send money home. These migrants then encouraged the recipients in the rural areas, usually their wives, to also complete a diary. For more detailed information about the participants see Appendix E.

## **2.7 Validity and generalizability**

Ethnographic research has often received high marks in regards to its validity (Davies, 1999). However, it has been judged deficient in regards to generalizability. In regards to the former, the methods described above were combined to complement each other. Their combination facilitated the collection of different types of data, which strengthened understanding. For example, the financial diaries revealed the particularities of financial habits. The diaries also facilitated the collection of quantitative data. They revealed the number of money transfers made per month, % of income constituted by remittances and % of income stored in savings mechanisms. However, it was through the daily interactions with participants that the author was able to gauge *why* such habits exist. Furthermore, through the interactions occurring in the group interviews, points of consensus and contention were captured. These were explored further through the individual interviews. The combination of these methods facilitated the cross-checking of information gathered and interpretations developed.

In regards the generalizability, the goal of the research was to make theoretical inferences rather than empirical generalization. As was argued by Davies (1999), those engaging in ethnographic work should not seek repeated instances of particular conjectures of occurrences. Rather, they should seek the differences and variations that emerged in their research and make more profound the existing generalizations in their field. This research will make such a contribution within the STS literature in general, and the domestication theories in particular. Such theories provide a conceptual schema to explain what happens when a technology penetrates daily life. They also emphasize the contextual contingency of domestication and leave room for the identification of local factors that affect this process. Most of the studies employing this theory have been conducted in the North. The contribution of this study is to strengthen understanding of domestication by delineating the process in resource poor communities, and identifying the particularities of domestication in this context.

## **2.8 Influences in the field**

Numerous authors have argued that the vital role of and interactions with research assistants is often not given the attention it requires in ethnographic research (Bhoju Ram Gujar, 1992; Schumaker, 2001; Neve, 2006). There is no doubt that Richard, the research assistant from Kibera, had a vital role in the process and outcomes of the research. He influenced the type of data that was gathered and interpretations that were made. He also acted as a gate-keeper,

translator and security guard. He was familiar with, and had many connections in, both research sites. The author rarely visited the sites without meeting him. Most importantly, he explained some of the findings. As mentioned above, Richard grew up in Kibera. His rural home was in Bukura. He understood the local norms in both sites, which further helped the author to avoid uncomfortable situations. Below is an excerpt detailing one such situation in Bukura:

I did not sleep well last night. Gloria, the youngest daughter of Robert, had come to sleep in my bed again. I could not understand the actions of this little girl. Yesterday, she had slept in the other hut with her sister. Why was she back again today? The bed was not big enough for the two of us. As we walked to see Bernard [M-PESA agent] I asked Richard why this was happening. He laughed before explaining that she had only come to sleep in my bed because Jennifer, Robert's wife, was away. In Luhya culture, he continued, it was not appropriate for an unmarried woman to stay under the same roof as a married man...He said that Gloria would be sleeping with me until Jennifer returned. I then laughed and told Richard that I should invest in a bigger bed.

In situations such as this, Richard proved invaluable. By explaining local norms, he saved the author from both anger and embarrassment during interaction with informants. Richard also proved invaluable during the interviews. He knew and had already established a degree of trust with many of the informants. This made it easier to solicit information. This rapport was especially important because personal questions, regarding household finances and relationships, were asked. In some cases, this resulted in some negative reactions from the informants. On one occasion, a woman threw a coke bottle at the author after being offended by a question. Richard worked hard to avoid such situations in the future. Before the interview began, he would explain the purpose of the research to the informants. He would also monitor the reaction of the informants and stop the interview when he thought they were becoming uncomfortable. This saved the author from dodging coke bottles on more than one occasion. But in some instances Richard's presence had the opposite effect—it hindered the interview process. This was especially the case following the post-election violence, when ethnic tensions were high. Some non-Luhya informants refused to talk with Richard. One Kikuyu man even told him that he should not waste time interviewing his enemies.

Richard also faced his own challenges as a result of the work. For example, informants were constantly calling or visiting Richard to schedule an interview. This made his wife very angry. He was also receiving many requests for money from his friends and neighbours. They thought that he was rich because he was working with a *mzungu* (white person). He

explained that some would react negatively when he refused. Because of Richard's central role in the research, it is only appropriate that he too is written into the final ethnography. A short piece detailing his experience in the field is included in Appendix F.

### ***2.81 The mzungu can't "go native": The researcher's place in the context***

As the research progressed the author noticed an interesting trend—most of the community members did not call her by her first name. Rather, she was called *mzungu*, the Kiswahili word for white person. This did not change even after a long time was spent in the community and ties with informants strengthened. "Tell the *mzungu* that dinner is ready", she would hear Jennifer yelling to her children. "I am in Bukura with the *mzungu* next week", she would hear Richard tell his friends. She soon realized that there was no escaping the *mzungu* identity. She thus decided to embrace it, and even enjoy it. The author never ceased to be amused by the reactions that her presence would engender, especially amongst rural informants. On one occasion, she was given a live chicken after finishing an interview in Bukura. The informant declared that the author was a guest of honour. She never before had a *mzungu* in her home.

For the author to embrace this new identity, she needed to understand it. She knew that being a *mzungu* affected the types of relationships that she could form with informants. This, in turn, impacted on the information that she could gather and interpretations that she would make. She thus began to record some of the assumptions made about the *mzungu*. An understanding of these assumptions would provide insight into the reactions of informants. Below is an excerpt from her fieldnotes. It describes a conversation she had over dinner in Bukura:

I asked Robert [research assistant's uncle] to explain to me what a *mzungu* was. I heard the stifled laughter of the other family members...Robert told me that the *mzungu* was always rich. Some, he continued, had good hearts. They would use their money to "make things better in Kenya"... *Nyanya* (Grandma) then added that the *wazungu* (white people) were rich because they were "advanced". They were not "idle" like the Africans...They knew how to build very good roads and schools.

The author soon learned that others also shared these views. According to her informants, the *mzungu* was different from their "African brothers and sisters". They were usually wealthier, more advanced, more intelligent, and harder workers. Most came to Kenya with the objective of providing assistance to "poor Kenyans" and fostering "development". She

received countless invitations to the homes of informants. Some asserted that they wanted her to evaluate their situation and provide them with advice on how it can be improved. She never knew how to interpret such requests. She certainly did not feel qualified to give advice, especially since her own bank balance was usually close to zero.

The reactions of informants became clearer, and more predictable, after the author gained a better understanding of these assumptions. For example, many would seek compensation for the interviews because they perceived the author to be wealthy. Some would further be dishonest about their income, usually under emphasizing their earnings. Richard explained they did this because they expected an offer of assistance after the interview. They believed that their chances of acquiring such an offer would increase if they communicated that they were “broke”. Whenever possible, the interviews were conducted more than once. With increased interaction, rapport was built with the informants. This resulted in more honest responses.

The author’s status as a *mzungu* also allowed her to circumvent the patriarchal structure and interact with male informants more freely. Richard explained that some men were probably more honest in their responses because the author was a *mzungu*. It was not usual for men to be this open with unmarried women in the community. Richard further explained that as an outsider, the author was less likely to contact and inform their wives about their behaviour in Kibera. As a result, some men spoke openly about their extramarital affairs in the city. In this regard, the *mzungu* status was not without its advantages. The author was kept up to date on the gossip of some of the local men. Occasionally, she also received a chicken.

## **2.82 The post-election violence**

The fieldwork took place during the post-election violence, one of the most violent periods in Kenyan history. A section of this chapter will be allocated to the description of this event because it had a drastic impact on daily lives of the informants. It also had an impact on the research process and findings.

The disputed presidential elections of December 2007 eventually erupted into wide-scale violence. As a result of this violence 1500 people lost their lives. Another 600,000 were displaced from their homes (“Kenyan Leaders”, 2008).<sup>6</sup> Aside from instigating violence,

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<sup>6</sup> The violence first occurred after the announcement of the re-election of incumbent President Mwai Kibaki by the Election Commission of Kenya (ECK). However, strongholds of the opposition Orange Democratic Movement (ODM) were certain that they had been cheated out of victory. Their leader Raila Odinga was said to have a clear lead with more than 370,000 votes with 90 percent of constituencies. However, when the ECK announced the results, they asserted that Odinga had lost by



protesters displayed their anger in a number of ways. Road blocks were set up on major roads. The railway, which connects Mombasa to Kampala, was also dismantled. This had a significant impact on money flows within Kenya. It was difficult, and sometimes impossible, to physically move money across the country. Financial services were also affected. Many banks and MFIs remained closed because of the constant insecurity. This was problematic for many Kenyans. There was a great demand for cash during this period. Some needed to escape the threat of ethnic violence. Others needed to purchase basic commodities such as food and water.

The post-election violence had a significant impact on daily life, even after the violence subsided. One vital determinant was inflation. The Central Bank of Kenya (2008) reported the inflation rate to be 22% for 2008. Our empirical findings noted a similar figure of 23%. Table 5 details the cost of items in Bukura preceding, and following the violence.

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nearly 200,000 votes. Many Kenyans became outraged. Almost immediately after the announcement of the results, protests erupted on the streets of Kenyan towns. It has been reported that at the beginning of the violence the Kikuyu, the President's ethnic group, and those suspected of voting for Kibaki were targeted. However, this eventually resulted in retaliation attacks. Many of these attacks were instigated by the mungiki, a criminal gang composed mainly of Kikuyu. These revenge attacks took place mostly in the informal settlements, and they were violent. According to the media, hundreds of mungiki were beheading and dismembering ODM supporters. For more information about the violence see Barkan (2008).

<b>Good</b>	<b>Cost of item in December 2007-KES</b>	<b>Cost of item in May 2008-KES</b>	<b>% rise in cost</b>
Sugar-1kg	62	65	5%
Tea leaves-500 grams	150	160	6%
Bread-1 pack	25	30	17%
Cooking fat-1 kg	120	160	25%
Soap-1 bar	45	55	18%
Vaseline-50 grams	30	33	9%
Rice-1 kg	50	70	29%
Baking flour-2 kg	80	120	33%
Juice-1 litre	80	85	6%
Maize meal-2 kg	50	70	29%
Soda-300 ml	15	20	25%
Milk-250 ml	20	30	33%
Iron sheet- 1 sheet	560	750	25%
Nails-1 kg	80	120	33%
Barbed wire-25 kg	2400	3200	25%
Cement-50 kg	720	970	26%
Fertilizer-50 kg	2800	4000	30%
<b>Average price increase</b>			<b>22%</b>

**Table 5: Inflation Rates in Bukura**

The shop-keepers noted a significant increase in the most popular items. For example, milk, baking flour, maize meal, and fertilizer all increased by one-third. As will be described in the empirical findings, this put new constraints on the limited income of multi-spatial households. Prices increased whilst money became difficult to access and circulate. This affected the livelihood strategies that were cultivated. It also instigated new usages for the M-PESA application.

The author returned to Kenya in early February of 2008. There was still a significant amount of sporadic violence during this period. Kibera, in particular, was heavily affected by the events. This excerpt was written after the author's first trip back to the informal settlement:

I could see that many of the buildings that lined Kibera drive were now gone. All that remained were heaps of burnt rubble...The street had completely changed. Most of the shops were gone. The rubble that remained was vandalized with political messages. 'No Raila, No Peace', was written on the wall of a shop. 'Keep peace Anywola [comrade]' was written on another...Between some of the

rubble, there stood a middle-aged woman looking at the charred remains. She was picking up rocks and throwing them onto the side...I noticed that there were very few people in Kibera. Richard explained that the place was now a 'ghost town'. He told me that many people prefer to remain in their villages because they do not know when the violence will erupt. 'Anything can set things off', he continued.

That same day violence erupted in Kibera. The author and Richard were making their way out of Kibera when they heard whistles. Richard cursed and grabbed her arm. They started to run towards a line of busses that stood ahead. Richard managed to flag one down, and he pushed her onto the bus. He explained that a riot was breaking out. She looked out the window and saw that a crowd, constituted mainly by young men, was starting to gather. Some of these men were carrying tires. Richard explained that they were erecting a road block. The author then saw the bus driver increase his speed to circumvent the pile of tires. As they passed, she could hear some of the young men screaming. Several loud thuds were also heard. They were throwing stones at the bus.

They managed to make it out of Kibera safely. However, they decided to stay out of the informal settlement until the violent outbreaks had subsided. The focus was then put on finding a second site for the research. The two headed to Western Kenya and began to visit villages around Kakamega town. The author soon realized that this area was also not safe. A few days after their arrival, there was a confrontation with a group of young men just outside Kakamega town. The men made death threats after a confrontation with Richard. The author decided to leave town quickly, and boarded plane for Nairobi the next morning. She stayed out of the field until a peace agreement was signed in March.

The violence continued to impact daily life even after the peace agreement was signed. Rising inflation was coupled with an increase in crime. Before the author left Kenya, she experienced a car-jacking and mugging in central Nairobi. That same month, she also had malaria. Richard was convinced that someone had put a spell on me. The author suggested it was the woman with the coke bottle. By the time the fieldwork ended, she knew that an important decision had to be made—if and how such experiences will be written into the final ethnography. She decided to follow the advice of Kovats-Bernat (2002) who suggested that researchers should make violence central to the presentation of the findings. Such violence affected her relationship to the fieldsites. It also affected her interactions with informants. After the riots, she became much more cautious in Kibera. She no longer walked through the informal settlement alone. To avoid being caught in another riot, she began to spend more time in the homes of informants. She also became more cautious about who was

interviewed and no longer stood outside the M-PESA shop waiting for informants. Instead, the author asked Richard and the M-PESA agents to put her in contact with interviewees. This method made it more difficult to secure interviews as the network of informants was constrained. It did, however, provide her with additional security whilst in the field.

### **2.83 Money talks: The role of money in the fieldwork experience**

Several authors have argued that ethnographers often fail to recognize the role of money in their final knowledge production (Weinreb, 1998; Senders & Truitt, 2007). They further note that money—more than any other object, force or sign—gives shape not only to initial fieldwork relationships but also to the entire ethnographic encounter. As will be described below, this was certainly the case during the fieldwork.

One of the first of these decisions was if, and how, informants should be compensated. At the start of the fieldwork, compensation was not provided. However, it was soon realized that most informants expected “something small” after the interaction. Some became angry when Richard made clear that they would not receive anything. One woman even yelled at the author after an interview. She claimed that the author should not be “taking advantage” of poor Africans. In many ways the woman was right. The author had much more to gain from the interaction. The data collected from informants would be used to publish papers, write a doctoral dissertation and advance the author’s career. She was not sure how, and if, such interaction would benefit the informants. For this reason, she saw it appropriate to give something back.

When she first began to provide compensation, it was in kind. That is, she would purchase a soda for informants during the interview. If she was conducting an interview in the home of the informant, she would bring them a small gift. Usually, it would be 1 kg bag of sugar. Richard explained that this adhered to local norms. Usually, visitors were expected to bring “something small” to the home. Such an expectation increased when the visitor came from Nairobi, or was a *mzungu*. In return, the visitor would be offered some tea and food. Eventually, cash was given out. This was mainly done for practical reasons—the sugar was too heavy to carry. The author did have some ethical concerns about giving out cash. She questioned whether this type of compensation came dangerously close to paternalism. She also considered whether she was creating relationships of dependency with some of the informants. In some cases, this proved to be true. The author would receive countless phone calls from informants asking for money. She was then faced with another dilemma—the extent to which her obligations to informants extended. She saw many of the informants on a

daily basis. By refusing to give money she was undoubtedly altering the nature of the relationship. She decided to treat each case individually and to not make any firm rules regarding such compensation.

There was also a methodological basis for the decision to compensate. Word quickly spread around Bukura and Kibera that “something small” was being given after the interviews. This made it easier to find informants. It also made it easier to solicit information. Many informants were more willing to discuss sensitive issues after hearing that they would be compensated. This includes personal income sources, financial habits and the nature of familial ties. Urban informants were also more willing to provide contacts to rural relatives. Because a multi-sited ethnography was being conducted, such contacts proved invaluable. There were, however, instances in which the decision to compensate impacted negatively on the data collection process. The author quickly discovered that people were telling her what they thought she wanted to hear, rather than the truth. As mentioned above, some informants were dishonest about their income levels. They expected to receive more compensation if the author thought them to be extremely poor.

It was not just the informants that had to be compensated, but also the gate-keepers. On more than one occasion the author was approached by a village elder who asked for some money. Again, Richard explained that life would be much easier if such requests were met. The author took his advice. In a patriarchal society, these elders had a significant role in the daily affairs of the community. Maintaining good contacts with them facilitated access to informants. This chapter will not delve into the discussion of the ethics behind this type of compensation. From an early stage in the research, the author discovered that she was operating in a system very different from her own. She did not have the ability, or the interest, to change it. She instead chose to adopt the methodology to the system and adhere to the local norms of reciprocity.

Finally, a discussion about money would be incomplete without a mention of the funding bodies. Financial support for this project was provided by two institutions—the University of Edinburgh and Microsoft Research (MSR). These scholarships covered tuition, and research expenses. They also provided a generous monthly stipend. This greatly facilitated the research process. The author was able to put her entire concentration on the collection of data, travel frequently between the two research sites and compensate informants.

## ***2.9 Exiting the field***

The exit from the field was just as difficult as the entrance. After fourteen months the author had become accustomed to Kenya. She enjoyed the long days in the field and did not want to be back to Edinburgh, and be cooped up in an office. Again, the methodology books did not prepare her for this—leaving a foreign land that she initially feared but had come to love.

She left Kenya in December of 2008. Some of the challenges that emerged from the fieldwork, however, followed her back to Edinburgh. Richard would frequently pass on requests for money from past informants. He would even make some himself. The author had to ask Richard to stop making these requests. Back in Edinburgh, the author also began to think about her own contributions to the research sites. She felt that she had not done enough for the communities. This led her to question if she had any obligations to the informants. It also led her to consider what could be done with the research findings, aside from publication. She continues to resolve these issues.

## ***2.10 Conclusion***

This chapter identified numerous influences in the field, from research assistants to recurrent violence. These influences are vital to understand because they shaped the trajectory of the research process and led to particular types of outcomes. The post-election violence was featured heavily in the chapter. This event, and the recurrent shocks that followed, kept the author out of the sites on more than one occasion. It also facilitated some very interesting findings, which will be detailed in the next few chapters. As a result of such violence, this thesis is not just about M-PESA usage and outcomes. It is also about M-PESA usage and outcomes in the context of post-election violence.

Money was also integrated into the analysis. It was made clear that the majority of fieldwork relationships, and the entire ethnographic encounter, was shaped by money. The ability of the author to travel around the country and compensate informants greatly facilitated the research process. It also caused some problems. In some instances, informants did not give honest responses regarding their level of income to secure additional compensation. The vital role of gatekeepers was also made clear. Individuals such as Richard from Kibera and Robert from Bukura facilitated entry into the field. They further facilitated processes of data collection and interpretation making. Finally, the numerous methods used to collect the data, and their complementary nature, was discussed. For example, the diaries captured financial practices. The interviews explored why such practices exist. This delineation of the research experience is vitally important for presentation of the empirical findings—the choices made

during the fieldwork encounter influenced the analysis that will be presented in the next three chapters.

## **Chapter 3: Explaining the M-PESA System**

### ***3.0 Introduction***

This chapter will make clear that if the success of M-PESA is to be understood, the technology cannot be examined in isolation. Rather, it must be analyzed as part of a complex system. Thomas Hughes' (1986;1990;2005) socio-technical systems model will be used to frame the discussion. This model has been used to explain the growth of other large scale technologies, from electric power systems to steam boats. It uses several concepts to explain such growth. The first are the elements that constitute the system. In the case of electric lighting this includes physical artefacts (transformers, wires, and the light bulb), organizations (manufacturing firms, utility companies, and investment banks), and legislative components (laws, regulation). The framework presents all of these elements as inter-dependent. It makes clear that if a component is removed from the system or if its characteristics change then the other elements will alter their characteristics accordingly.

The framework also identifies system builders as being vitally important. It makes clear that these builders come from a variety of backgrounds and have a diverse set of roles. Some are engineers and scientists whilst others are managers. A variety of strategies are taken by the builders to expand and maintain the system. For example, they enrol and interconnect the diverse set of elements into a coherent whole. They further protect the system against potential threats or "reverse salients". According to Hughes, these salients come in a variety of forms and emerge unexpectedly. If not addressed, they can contribute to the destabilization and eventual degradation of the entire system. To avoid this from happening, the builders integrate the elements so that the system either adapts to, or turns away from, these potentially hostile forces. If the reverse salients emerge from within the system then builders rearrange the other elements, or enrol new ones, to lessen the severity of the threat.

The environment in which the system develops is also given attention. For Hughes, the environment includes all the intractable factors that are not under the system's control but influence the system. Regulatory legislation is a good example. The structure of the economy is another. Hughes pays particular attention to the influence of the environment during the development phase. He notes that system builders develop their inventions to survive and thrive in their surroundings. They do so by anticipating the various factors that the system will encounter and incorporating responses into the design. For example, if system builders



anticipate that regulatory legislation will be influential then they will design the device to reflect the requirements anticipated. Furthermore, if they anticipate particular needs of users then these will also be integrated into design. Akrich (1992) uses the concept of technological script to make a similar argument. The author notes that designers use their understandings of the environment to inscribe a framework of action into the technology. She also makes clear that users do not always enact the script as intended by the designers. Instead, users modify the script to fit their needs and circumstances. This results in some interesting unintended usages.

Hughes further explains that managers incorporate the environment into the system to control the forces that threaten its survival. This is why the systems often reflect the societies in which they exist. But this need to integrate the technology into a whole also causes constraints on its design. For example, Edison designed the lightbulb not as an isolated device but as part of a system of electrical generation and distribution. The needs of the external environment were thus reflected in the design of the bulb. Hughes further makes clear that systems do not exist in isolation. In some instances, they are subsumed under large encompassing systems. These other systems are important to identify because they provide constraints on growth and can be a source of reverse salients. They may also facilitate growth by providing a platform for expansion. As will be described below, this was the case with M-PESA.

This chapter will use the systems framework to explain the rapid growth of M-PESA. It will discuss the various elements that constitute the system, and make clear their inter-dependency. The system builders will be incorporated into the discussion. The various strategies taken by these builders to expand and maintain the system will also be made clear. M-PESA will also be contextualized within its environment and the various factors that impeded and propelled growth will be highlighted. The other systems that shaped, and were shaped by M-PESA, will also be identified. This analysis will contribute to the discussion of ICT growth in the previous chapter. More specifically, it will show that processes of growth are complex, inter-dependent and contextually contingent. This is why it is difficult to pinpoint a few factors to explain them.

The chapter will be divided into four main sections. The first will provide an overview of the system's environment; the second will make clear the various elements that constitute M-PESA; the third will provide an overview of the M-PESA story, and make clear the various

strategies taken by the engineers to enrol and maintain the system; the final section will reveal the results of a nation-wide survey that detailed M-PESA adoption and usage patterns. It will show how a system can shape the financial and technological habits after becoming anchored into daily life.

### **3.1 The environment**

A variety of environmental factors shaped the M-PESA system. This includes everything from ethnic make-up to the structure of the financial sector. This section will discuss some of these factors. Such a discussion is important because it sets the context for the subsequent analysis of the system. As was mentioned above, the trajectory of growth is contingent upon, and shaped by, the environment.

#### **3.12 Introducing Kenya**

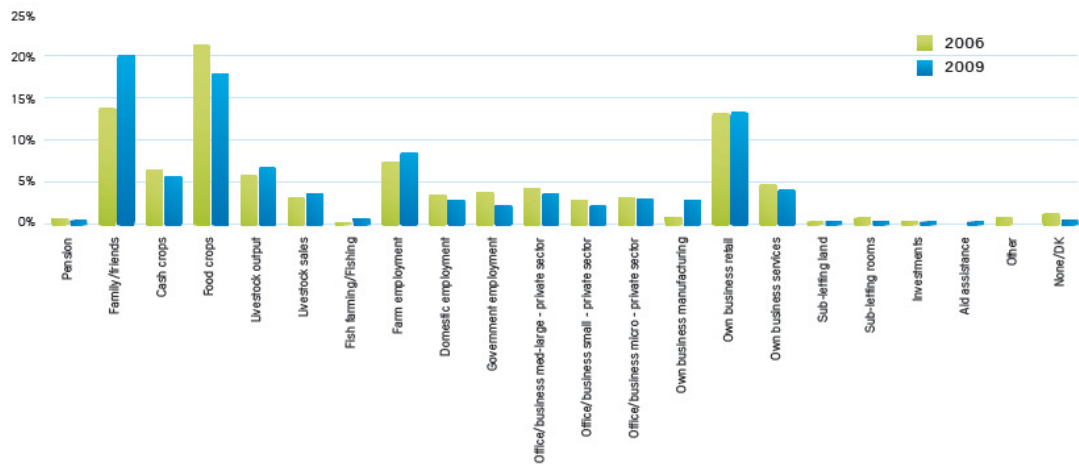
The republic of Kenya is home to nearly 39 million residents (CIA, 2010). A multitude of ethnic communities constitute the population. This includes the Kikuyu (22%), Luhya (14%), Luo (13%), Kalenjin (12%), Kamba (11%), Kisii (6%), Meru (6%), other African (15%), non-African (1%) (CIA, 2010). Nearly 80% of the population lives in rural areas and depends heavily on agricultural activity and subsistence farming for their livelihoods. Only 9.45 million have registered as being formally employed. Of this segment, 75% are employed within the agricultural sector, and the remaining 25% in industry and services (CIA, 2010). A large segment of the population is also employed on an informal or casual basis (King, 1996a; King, 1996b; 2001). Individuals in this sector undertake numerous activities such as carpentry, metal fabricating, candle-making, and tailoring. In 2000, the International Labour Organization (ILO) estimated that the informal sector constituted 98% of all businesses in the country, absorbed close to 50% of all non-farming employment seekers, had an employment growth rate of 12-14%, and contributed to 30% of total employment and 3% of GDP (Riley & Steel, 2000).

There are several characteristics distinguishing the informal sector, the first of which is size (Fortin, Marceau, & Savard 1997). The concept of the informal is restricted to self employed and micro and small enterprises (MSEs) with 49 or fewer employees (Riley & Steel, 2000). This sector is marked by legal informality. Many of these enterprises are not registered, do not pay taxes, and often do not comply with legal obligations concerning taxes or labour laws. The wages also tend to be lower in this sector, even for employees with identical skills. Fortin et al. (1997) blame such wage dualism on the high entry barriers to waged

employment as well as the inflated government-set wage rates that are prevalent in the formal sector. The government has cultivated numerous strategies to subsume the informal sector under the formal one, albeit none of them have been effective. Bigsten et al. (2000) argue that corruption in the public sector is one of the major reasons for such ineffectiveness.

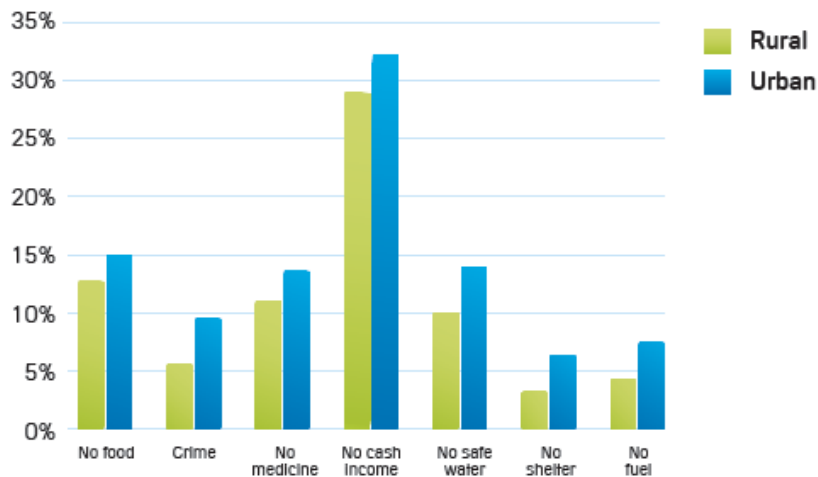
Aside from informal sector activity, Kenyans derive a significant portion of their livelihoods from transfers made by family and friends. As is shown in Figure 3, this was one of the most significant sources of income. One major reason for such transfers is the disparity of economic activity (Juhn, et al., 1993). Although the majority of the population lives in rural areas, a significant portion of such earning activity is located in urban centres. There is also a significant wage differential between urban and rural areas. This is even after adjustments have been made for differences in living costs. For example, the mean monthly wage for paid employment in urban centres is more than twice that of rural areas (Society for International Development, 2004).

Other inequalities are also prevalent. For example, there exist severe variations in regards to income with 10% of the richest households in Kenya controlling 42% of incomes whilst the 10% of the poorest control .76% of income. In many instances, these inequalities have a regional dimension. For example, Nairobi, Rift Valley and Central provinces account for 60% of total formal employment although they account for only 45% of the entire population. The provinces with the least share of employment are North Eastern and Western (Society for International Development, 2004). There are also disparities in regards to access to infrastructure such as roads. Road density is highest in Nairobi with 3.2 km of paved road per square kilometre of land. It is much lower in places such as Western province (1.4 km), North Eastern (.1 km) and Coast (0.3 km) provinces. Access to water and electricity is also heavily skewed. The proportion of households with electricity in Nairobi is higher than all seven provinces combined. Such inequalities occur mainly because the government has concentrated their efforts, and resources, on the development of urban economies (Society for International Development, 2004). As a result of this uneven focus, Kenya has been ranked amongst the 10 most unequal countries in the world.



**Figure 3: Sources of Livelihoods in Kenya (FSD, 2009)**

Because of these inequalities, poverty rates are high. It is estimated that nearly half of the population lives below the poverty line (CIA, 2010). In absolute terms, this means that close to 20 million residents are considered to be extremely poor (World Bank, 2007). Within this segment, the following shortages were recorded: cash income (32.4%), food (15.2%), safe water (13.8%) and medicine (13.5%). Cash shortages are especially prevalent in North-Eastern and Western Province with 69% and 52% respectively reporting deficits in their cash income (FSD, 2009). These disparities are made clear in Figure 4.



**Figure 4: Resource Shortages (FSD, 2009)**

In regards to other standardized measures of poverty, Kenya ranks poorly. For example, it ranked 152<sup>nd</sup> out of 177 countries on the human development index (HDI)—a measure of a country's achievements not only in gross domestic product (GDP) but also health and education. This is mainly because life expectancy at birth measure was 47.5 years, whilst the combined school enrolment ratio (primary, secondary and tertiary) was 60.1 % (UNDP, 2006). It has been reported that over the last decade, the population has become increasingly vulnerable to poverty and the UN argues that there continues to be a so-called 'slippage' in the country's human development situation (UNDP, 2005). The report blames this slippage on the corruption and mismanagement of the government officials (Bretton Woods, 2007). Although the comprehensiveness and validity of the HDI measure can be contested, it is useful in this context to show how the maldistribution of resources by the government has impacted vital sectors such as healthcare and education. An understanding of this structure of corruption demands a historical analysis of Kenya's political economy, which is provided later in the next section.

Many of the factors presented here had an effect on the development of the M-PESA system, albeit indirectly. For example, the high rates of poverty and inequality coupled with wage differentials between urban and rural areas created a remittance economy. Such inequalities further made Kenya an ideal place for a "development project". As will be made clear later in the chapter, a grant from DFID gave the project the impetus to move beyond initial conceptualization. The empirical findings will also make clear that informal nature of economic activity also drove adoption. Many Kenyans remained unbanked because their wages were not funnelled through a formal account. For this segment, a system like M-PESA was extremely useful. It allowed them to engage in a variety of financial transactions without registering with a bank or MFI.

### ***3.13 The evolution of Kenya's political economy***

The evolution of Kenya's political economy is also vital to understand. This is not only because such an environment fostered the inequalities that were mentioned above. It is also because it gave shape to the telecommunications and financial sectors, which are also vital to shaping the system. These will be described in the next section.

Kenya gained independence in 1963, after being under British colonial rule for almost 70 years (Gertzel, 1970). Under the rule of Kikuyu<sup>7</sup> president Jomo Kenyatta, Kenya became a republic and began its transition towards full independence. It must be noted, however, that this new political order continued to be contingent upon the political tradition and institutional framework that was inherited from the past. One prominent characteristic of such a tradition is tribalism (Klopp, 2002). Both Kenyatta, and subsequent president Daniel arap Moi, concentrated economic and political power in the hands of their trusted circle of fellow tribesman (“Africa Calling”, 2007). This resulted in the emergence of a post-colonial African state that was riddled with corruption and neo-patrimonialism, as the new African elite used the state’s resources for the benefit of their own ethnic community (Brown, 2003).

After independence, the government seized control over virtually all key sectors and cultivated strategies to ‘Africanize’ the local economy and instigate industrialization (Were et al., 2005). For a decade following independence, such strategies fostered economic growth as GDP increased 6.6% per year on average (Were et al., 2005). However, a series of external shocks in the early 1970s made clear the state’s vulnerability and inability to handle economic crises. In reaction to these shocks, the government tightened import controls and began to seek external financial assistance from international institutions such as the World Bank and International Monetary Fund (IMF).

The last two decades have been marked by economic reforms and structural adjustment programs (SAPs). Both the World Bank and IMF have urged the government to move away from colonial trading patterns and argued that such partners created dependencies that impeded economic growth. They have also urged the government to adopt economic reform strategies centered on the liberalization and privatization of key sectors. This process of economic reform has been plagued with problems since independence. There have been reports of corruption and opportunistic implementation. This has resulted in in wasted public resources (UNDP, 2005). There have also been accusations that several ministers are continuously funnelling large sums of public money towards illegitimate deals (World Bank, 2007).

More recently, the Kibaki administration has focused its policy reform around a strategy called ‘Kenya Vision 2030’ (Oyuke, 2006). This ambitious strategy aims to strengthen

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<sup>7</sup> The Kikuyu is one of Kenya’s largest, and most famous ethnic groups. The Mau Mau’s movement which resulted in Kenya’s independence from Britain was constituted mainly by Kikuyu members. See Lonsdale (1990).

institutions of governance and to fight corruption at high levels in the system (Oyuke, 2006). It further aims to stimulate economic growth by transforming Kenya into a middle income economy in the next 25 years. The goal is to maintain a growth rate of at least 10% per year (African Economic Outlook, 2007). This will be done through the restructuring and investment (500 billion Ksh) in six key sectors including financial services and telecommunications. As will be described below, this Vision in conjunction with the move towards liberalization has had a profound effect on the direction of these two sectors.

### ***3.14 Strategies for financial sector expansion in Kenya***

The Kibaki administration inherited a poorly functioning economy as well as a weak financial system when taking office in 2002. This was a result of reforms that were introduced under the Moi administration in the early 1980s and 1990s (Brownridge & Harvey, 1998). These aimed to decrease the dominance of foreign-owned banks through the instigation of competition in the market. Such reforms proved ineffective and many of the locally owned institutions failed during this period. The larger players began to focus on cost restructuring, which resulted in a series of branch closures in less profitable rural areas. To strengthen the financial sector, the Kibaki administration developed a comprehensive strategy of financial sector reform, which constitutes Vision 2030. This strategy focuses on increasing the efficiency of the sector and expanding access to the unserved segments. It also has the ambitious goal of decreasing the share of population without access to finance from 85% to 70% (The National Economic and Social Council of Kenya, 2007).

Currently, the banking sector is dominated by a few large banks, which control nearly 60% of the total market.<sup>8</sup> There are only 876 bank branches for a population of 39 million or .0022 branches per 100 people (Leishman, 2009). These figures can be compared to countries with a developed formal sector such as the US with 95,000 branches, or 3 per 100 or Germany with 40,000 branches or 5 per 100 (Moskow, 2006; White, 1998). It is estimated that only 22% of the adult population is formally included in the financial sector (Leishman, 2009).

There are also significant regional disparities in the number of bank branches and percentage of the population with a bank account. The penetration of banks and the number of users is much higher in the Nairobi, the Rift Valley, and the Coast region. Conversely, the North

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<sup>8</sup> Amongst these are Barclay's, Kenyan Banking Company Ltd., Citibank and Co-operative Bank of Kenya and Equity.

Eastern and Western regions have a much lower rate of penetration (FSD, 2009). The Central Bank of Kenya (CBK) (2008a) explains that there is a lack of presence in these areas because of “infrastructural challenges”. They also note that the bank distribution reflects the economic activity across the region. Their estimate, however, is more likely based on financial activity that occurs within the formal economy. As was mentioned above, informal economic activity is a significant source of livelihoods and is prevalent all over the country.

The commercial banks report that they have limited their operations in rural areas because the demand for services is low whilst the operational costs are high. Such low demand can be explained by stipulations for opening and minimum balances. It can also be explained by high transaction and maintenance fees. Those who have variable income flows find these balances difficult to maintain and the fees high in proportion to their savings. They instead turn to informal mechanisms for savings, which are described below. The research shows that the largest segment of account holders is formally employed as wage laborers in large establishments (28%). The unbanked are more likely to derive their livelihoods from agriculture (20%) or money transfers (20%).

The banks have taken numerous strategies to enhance their presence both in urban centers and underserved areas. This has been mainly done through the expansion of branches and ATMs. The CBK (2008a) reported that the branch network grew by 20% from 740 branches in 2007 to 887 in 2008. That same year, the network of ATMs also increased by 31%, from 1,012 to 1,325. Despite these efforts to expand access through ATMs, research shows that usage rates are not high. FSD (2009) found that only 13.4% of the respondents used the ATMs to access banking services. The report did not provide information on why this number was not higher. There have also been initiatives to extend financial services through agents in mobile banking units. Equity Bank, for example, has used vans to service villages in rural Kenya (Johnson & Malkamaki, 2006; Ivatury & Mas, 2008). These mobile banks visit these villages on a weekly, or bi-weekly basis and allow residents to perform a variety of transactions. Such services, however, are scarce. Currently, there are only 10 of these mobile banks operating in the country.

Other institutions such as Savings and Credit Co-operatives (SACCOs) and MFIs have also cultivated strategies to extend their presence in the market. In particular these institutions have targeted financially active segments of the population that have been ignored by banks. This mainly includes informal businesses, micro-enterprises and agricultural workers.



However, the outreach of these institutions is low compared to the banks. SACCOs provide services to 13.1% of the population while the MFIs serve 1.7% (FSD, 2009). Numerous independent players have also entered the market. One example is PayNet, a service provider that runs the largest network of ATMs in Kenya. Over 120 of these ATMs are spread out in all eight provinces. A substantial segment (67%) of these ATMs is located outside Nairobi and surrounding areas. Paynet has cultivated a variety of partnerships to increase the reach of the ATM network. This includes both debit and credit card services (Maestro, Visa, Cirrus, Amex). It also includes a variety of financial institutions such as banks (KCB, Consolidated, Standard Chartered), and SACCOs (Kilifi Teachers, Stima). They have also formed a partnership with Safaricom to allow M-PESA withdrawals. The FSD (2009) study revealed that usage of PesaPoint ATMs is increasing amongst the banked has increased over the past three years from 7.8% in 2006 to 13.6% in 2009.

Despite the numerous players in the sector and the strategies taken for the expansion of services the majority of the population continues to be unserved, or underserved by formal financial institutions. This is probably another reason why Kenya was chosen as a site for the project. It fit in well with the DFID's initiative to extend the reach of financial services to those who were "unbanked" or underserved by formal financial institutions. The under-representation of financial services can also help to explain the demand for a system like M-PESA. A large segment of the population does not have access to formal services. As such, they are looking for alternative ways to transfer and save their limited income.

### ***3.15 Branchless banking and mobile transactions***

To extend the reach of financial services the CBK has worked with a variety of financial institutions to cultivate branchless banking strategies. Such strategies extend the reach of financial services beyond the physical bank branches and usually have two main objectives. The first is to minimize the operational costs for the service provider. The second is to make services more accessible to customers. This is both in terms of physical outreach and affordability. Most of these models rely on technology for the delivery of services. This includes automatic teller machines (ATMs), point of sale (POS) terminals, telephone and internet banking, and debit and prepaid cards (Mas, 2009; Mas & Kumar, 2008). These technologies are manipulated in a variety of ways to decrease the cost per transaction and allow for scalability of services (Ivatury & Mas, 2008; Ivatury & Lyman, 2007). Agents are also vitally important for these models (Lyman et al., 2006). This is mainly because they facilitate delivery outside of the branch. In many cases, the agents are located in places that

are accessible to customers. This includes gas stations, grocery shops, and pharmacies. They are also located in places that cannot be easily accessed by traditional bank branches, either because of the infrastructural deficits or high costs associated with outreach (Mas, 2009).

The branchless banking strategies come in a variety of forms. As mentioned above, ATMs and mobile banks have been used to extend the reach of financial services. More recently the mobile phone has also been implicated in these strategies. Because the technology is pervasive, many are recognizing its potential to offer financial services at scale. The literature discusses two different models of branchless banking that utilize the mobile phone—the bank-led and the non-bank led model (Mas, 2009). The two differ in regards to the ownership of the account. In the bank-led model, the financial institution takes ownership. Users often have a pre-existing relationship with the institution. The mobile simply provides another means through which financial services can be accessed. The term “additive model” is often used to describe this type of branchless banking (Lyman et al., 2006). As will be described in Chapter 6, a variety of commercial banks in Kenya have introduced additive banking services via the mobile phone. M-PESA belongs to the second class of models—the non-bank led. In this model, a non-bank entity has ownership of the account. It must be noted that the bank also has a vital role in this model. It facilitates the management of cash float. It also stores the aggregate sum of cash to back the electronic value in the virtual accounts.

This effort to expand the reach of services via branchless banking models has been accompanied by some interesting developments in the regulatory environment. The CBK is making a move towards the regulation of agents. More specifically, the banking act is being revised to specify the activities that may be conducted by agents (CGAP, 2007). The CBK is also taking responsibility for non-bank led services such as M-PESA. This is mainly because such services involve the transfer of funds and deposit taking. Both of these activities fall under the jurisdiction of the CBK. The aspect of deposit taking is particularly interesting. Under Kenya’s banking laws, if an institution accepts deposits and uses that money for lending or investment it usually requires a banking license. It is also limited to transactions through head offices or branches. Such stipulations have limited the growth of the financial sector in the country. This is mainly because operating through fixed locations is subject to very detailed regulatory requirements. It is also expensive. In an effort to expand the breadth of the financial sector, the CBK has allowed for MOs to outsource their deposit taking

activities to agents. However, such outsourcing is approved on a case by case basis. There are no regulations explicitly governing this activity.

There are also particular aspects of mobile transactions for which legislation is being developed. For example, the current anti-money laundering/ combating financial terrorism (AML/CFT) regime covers only financial institutions that are licensed and regulated by the CBK. The existing guidelines for such institutions have very specific know your customer (KYC) requirements such as photo identification. Kenya also does not have any laws governing electronic money. This means that customers are not actually protected against the loss of their electronic value. This lack of regulation is problematic. As was made clear in the introduction, billions of Kenyan shillings have been transferred through the M-PESA system since launch.

To address the gaps in the regulatory market and facilitate the growth of innovative products such as M-PESA, the CBK is in the process of developing the National Payments System (NPS) bill. Such a bill would classify systems like M-PESA as payments service providers rather than deposit taking institutions. It would also provide such services with a very specific set of AML/CFT and e-money guidelines and make providers subject to inspections and reporting.<sup>9</sup> The NPS is expected to be passed into law in late 2009. These regulatory considerations are important to understand because, as will be made clear below, they radically shaped the development of M-PESA

### ***3.16 The informal financial sector***

Numerous empirical studies have noted the extensive use of informal financial services in Kenya. This is particularly the case with savings mechanisms. The FSD (2009) survey revealed that half of the respondents used these mechanisms to store their money. The most popular were Rotating Savings and Credit Associations (ROSCAs) (31.7%), Accumulating Savings and Credit Association (ASCAs) (7.8%) as well as the home (55.7%). The study further revealed that these mechanisms were not just being used by those who were “unbanked” or “excluded” from the formal financial system. Over a third of those with a bank account also used an informal service. The various reasons for this will be made clear in the empirical findings.

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<sup>9</sup> It will further have a set of clearly defined rules regarding Anti-Money Laundering (AML) and Combating Financial Terrorism (CFT) regulation.

One of the most popular in Kenya is the ROSCA (Dupas & Robinson, 2009; Gugerty, 2007; Johnson, 2004b). These associations take many forms and membership is usually based on pre-existing ties. The members meet at regular intervals and contribute funds, which are then given to members in turn. Once every member has received the pot of money, the group is disbanded. ROSCAs are particularly popular amongst women, especially those who are older and generating an income. For example, a study in Kibera found that 84% of ROSCA users were female (Anderson & Baland, 2002). A study in Western Kenya found this number to be higher, at nearly 90% (Gugerty, 2007). Research further suggests that this mechanism is popular amongst women because it allows for the concealment of money from daily demands made by relatives and friends (Anderson & Baland, 2002). It also disciplines the women to save. In particular, the peer pressure and trust built on reciprocity between the members in the group strengthens such discipline. Aside from an economic, the ROSCA also has a social function. Through processes of money management, the members of the group strengthen their social ties. By saving together, they also learn how to more effectively manage their money (Collins, 2005; Collins et al., 2009).

ASCAs are also used (Johnson, 2004a; 2004b). These associations are similar to ROSCAs because they require members to meet on a regular basis to contribute money. However, rather than being given out at each meeting the contributions are lent out to group members and in some instances outsiders. Interest is usually charged on the loans and a repayment schedule is confirmed with the borrower. Any money that is not lent out is held by the group treasurer or in a bank. After a point in time, the savings along with the interest is distributed back to the members. Social funds are also used for group savings. Unlike the ASCA, these funds are accumulated for a specific purpose. Group members will meet and contribute money for a contingency such as sickness or death of a family member. These social funds go by different names such as welfare account, or emergency fund (Mugwanga, 1999). This fund usually acts as a substitute for insurance products. Research shows that only 6.8% of Kenyans are using such products (FSD, 2009).

The home is another popular mechanism for savings. Most Kenyans keep a small stash of money hidden away in a cupboard or underneath the mattress. Sometimes, small tin boxes called “home banks” are used for the storage of money. These are usually used for the accumulation of cash as money cannot be accessed until the home bank is broken. As will be noted in the empirical findings, many preferred this method of savings because it was accessible and inexpensive. They also did not need to maintain a balance or pay for the

numerous maintenance fees that banks required. However, some asserted that money stored in the home also had its disadvantages. It was prone to theft as well as demands from household members and outsiders.

For a large segment of Kenyans, credit is also accessed informally (Biggs et al., 2002; FSD, 2009). As is shown in Table 6, only a small portion of the population had access to funds through banks (2.6%) and MFIs (1.8%) (FSD, 2009). Shop-keepers were the most popular means for accessing credit. Nearly 24.3% of the population accessed credit in this way. Some also depended on friends and family (12.2%) for cash loans (FSD, 2009). It must be noted that these figures do not include the multitude of non-cash exchanges of credit that are made between Kenyans. Such exchanges are a vital part of livelihoods and include items such as food, cattle, and even land. As will be shown in the empirical findings, these non-monetary transfers must also be given attention because they are a vital part of both social and economic life in Kenya.

<b>All Respondents</b>	<b>2006%</b>	<b>2009%</b>
<b>FORMAL</b>		
Savings—Postbank	5.6	2.5
Savings—Bank Savings Account	12.4	-
Savings—ATM/Debit	-	11.5
Savings—Bank, with Interest	-	11.6
<b>FORMAL OTHER</b>		
Savings—SACCO	12.5	8.9
Savings—MFI	1.5	3.2
<b>INFORMAL</b>		
Savings—ASCA	5.4	7.8
Savings—ROSCA	29.3	31.7
<b>EXCLUDED</b>		
Savings—Group of friends	10.9	5.5
Savings—Family/friend	5.7	6.7
Savings—Secret place	27.9	55.7

**Table 6: Savings mechanisms in Kenya (FSD, 2009)**

The activities and mechanisms constituting the informal financial sector are also important to understand. The empirical findings will show that many of the M-PESA usages were linked to informal sector activities. For example, M-PESA was used in conjunction with the home bank for savings. Some would accumulate a small amount at home and thereafter transfer that money into their M-PESA account. Others used the system as a substitute to home savings because it provided additional security. The application was also used for cash exchanges within the informal sector. As the empirical findings will show, some members

made ASCA and ROSCA contributions via M-PESA. This usually occurred when the members were not able to attend the weekly meetings.

### ***3.17 The telecommunications environment: Explaining growth***

The telecommunications environment has also shaped M-PESA. As will be shown in this section, the government has taken numerous strategies to increase the penetration rates of ICTS in general and the mobile phone in particular. This includes instigating competition in the market and including universal service stipulations in license agreements. Such stipulations made it easier for M-PESA to penetrate rural areas, which are under-served by financial institutions.

The expansion of the telecommunications sector was central to Vision 2030. Such expansion has been given emphasis under the premise that ICTs are vital “enablers” not only for economic growth but also social development. Currently, there are major discrepancies in regards to growth rates within the sector. For example, in December of 2008, Kenya had over 16 million mobile phone users (Kamau, 2009). This represents a penetration rate of over 41%. The pervasiveness of the mobile phone can be explained by the inefficiency of other ICT services, particularly the fixed line telephone. There are just over 500,000 fixed line connections in Kenya, the majority of these are concentrated in urban areas (CCK, 2009). The waiting lists for fixed line telephony services are famously long. In 2004 it was reported that 121,000 Kenyans were waiting for these services. This number decreased to 65,000 in 2007. Such a decrease was mainly due to the rapid expansion of the mobile phone sector. Aside from being difficult to access, many complained that the quality of fixed line services was poor. The rate for domestic call completion was 54%, and 48% for international ones (Tyler et al., 1999). Such inefficiencies stemmed from a monopoly of fixed line services by Telkom, which was state owned until 2007.

The liberalization of the telecommunications sector, which took place in the late 1990s, instigated the growth of the mobile phone subscription base. Almost immediately after such liberalization occurred, two mobile communications companies entered the market. The first was Safaricom, which began to offer services in 1997 as a subsidiary of Telkom Kenya. In 2000, the company became independent after a substantial portion (40%) was acquired by Vodafone (Safaricom, 2007). Kencell, a new entrant, also began to offer services in 1997. The company was thereafter bought out by Celtel in 2004, and Zain in 2008. The competitive environment changed again in 2008 when the government released licences to

two new entrants. The first was Orange, the commercial brand for Telkom Kenya. The second was Yu, a subsidiary of India's Essar Communication Holding. The competitive market has fostered the rapid growth of the subscription base. The four players have engaged in a fierce battle for customer acquisition and retention. Prices have been slashed and infrastructure improved. New services targeting low-income customers, such as prepaid scratch cards that allow for small value 'top-ups' have also been introduced.

Subscription rates have also been driven by the availability of mobile phone handsets. It is estimated that in early 2009 there were 17.5 million handsets in Kenya or 1.093 handsets per mobile subscriber ("Tax Cuts", 2009). This is a sharp increase from 2000 when the number of handsets was reported to be 200,000. The number of handsets is currently higher than the number of mobile subscribers because some use more than one SIM card to take advantage of the promotions offered across the networks. The supply of handsets has also depressed prices. For example, used handsets can be purchased in Kibera for as low as 500 (\$6.50 USD)-1000 Ksh (\$13 USD). Some MOs are also introducing their own handsets into the market. Vodafone released a series of low-cost handsets that can be purchased for 1300 Ksh (\$17 USD). The wide-scale availability of handsets was also vital to the growth of M-PESA, as the application resides on the mobile phone.

Besides liberalizing the market and instigating competition within the sector, the government has taken numerous other measures to instigate growth. For example, in April of 2009 the government eliminated the 16% VAT on new phone handsets ("Tax Cuts", 2009). The newspapers have also recently announced plans to cut tax on airtime. Furthermore, a universal service stipulation was included into the licences of mobile phone operators. As a result, services have been extended to a large segment of the Kenyan population. In 2009, it was estimated that 92% of the country has mobile phone coverage (UNHCR, 2009). This last point is vitally important, because it emphasizes the contingencies of growth for the mobile phone. Just as M-PESA was dependent on the mobile phone for growth, the mobile phone was dependent on the network. This reveals the highly complex inter-dependencies of elements and systems. Such inter-dependencies make the story of M-PESA even more interesting.

### ***3.18 The research on ownership and usage***

The wide mobile phone outreach and competitive pricing structure has translated into high penetration and active usage. The FSD (2009) study found that nearly half (47.5%) of the respondents owned a mobile phone. This was up from 29.6% in 2006. The rates for mobile



ownership are highest in urban centres (72.8%) in general and Nairobi in particular (80%). This is probably because wages tend to be more consistent and higher in urban areas. Rural usage also tends to be lower because of infrastructural constraints. Some parts of the country do not have access to mobile phone signal or the electricity needed to recharge their phones.

The research further revealed that mobile phones were used for a variety of purposes. As is shown in Table 7, 43.1 % sent text messages and 37.1% sent airtime. This had increased from 2006 when 29.2% sent text messages and 20.6% airtime. 4.5% of users also used their mobiles to access the internet. This number increased to 19.2% in Nairobi. An increasing number of people (2.8%) used their mobiles to pay their bills. Again, this number was significantly higher in Nairobi (13.4%).

	2006	2009
Owned a mobile phone	29.6	47.5
Used phone to text	29.2	43.1
Used phone to send airtime	20.6	37.1
Internet	-	4.5
Bill payments	-	2.8

**Table 7: Mobile Phone Usage (%) for FSD Survey Respondents**

These mobile phone habits are vitally important to understand. Because M-PESA resides on the mobile phone, such habits have driven the adoption and usage process. This is especially because the application interface is SMS based. The steps for sending a text message are not so different from those required to make an M-PESA transaction. The fact that many users owned, and knew how to use a mobile phone before M-PESA was introduced was vitally important to the expansion of customer base. This will be discussed in more detail in the empirical findings.

### ***3.19 Other systems in the environment: Safaricom, the better option***

In the introduction, it was mentioned that systems are often subsumed under others in the environment. In the case of M-PESA, it was Safaricom that was the dominant system. As will be described below, some staff members from Safaricom acted as vital engineers. They

developed the marketing campaign and enrolled new partners into the system. The empirical findings will further show that Safaricom's brand presence drove adoption rates. Many initially did not trust the agents with their money. They continued to use M-PESA because they trusted Safaricom.

Safaricom is one of the dominant players in the mobile telephony market. In March of 2009, the company held 79% of the market share, followed by Zain who had just 13% ("Kenya's Safaricom", 2009). The company is also one of the most profitable in Eastern and Central Africa and continues to grow. The year end results that were announced in March of 2009 show strong performance for the ninth consecutive year. Subscriber numbers have increased by over 30%, and revenue was over 70 Billion Ksh (Safaricom, 2009). These were impressive figures given the situation of the previous year—post-election violence, high inflation rates, and massive food shortages.

Safaricom has also taken a variety of other measures to gain, and retain, their market share. Many of these have been under the guidance of Vodafone UK, which owns 40% of the company. For example, not long after purchasing a share in the company, Vodafone assigned a new South African CEO called Michael Joseph to change the strategic direction of Safaricom. According to the Economist, Joseph was an unusual candidate for the job. He was a self-described "Bolshevik character" who lacked the "finishing-school polish" that was required of a European boss ("Africa Calling", 2007). But such a leader has suited Safaricom well. When Joseph arrived in 2000, Safaricom had just over 20,000 customers ("Africa Calling", 2007). Currently, they have over 16 million.

Led by Joseph, Safaricom quickly shifted its focus to the poorest and most price-sensitive segment of the market. "Pay as you go" services were introduced. So was per second billing, which challenged Kencell's (now Zain) per minute billing schemes. Most interestingly, the company worked on increasing brand loyalty by establishing an emotional connection with their customers. They did this by playing on nationalistic sentiments in their marketing campaigns. They re-branded and presented themselves as being distinctly Kenyan. For example, the television commercials illustrate various African landscapes. From farmers working in lush, green fields to the masai grazing their cattle on open plains. Such sentiments were further emphasized during the post-election violence, when the MO's radio adverts called for Kenyans to unite as "one people" in "one nation". The company has also invested in the expansion of their network coverage. Over 80% of the population in Kenya is reported to be covered by the Safaricom network. However, as Figure 5 illustrates, there are

still large patches of the country that do not have network coverage. These are mostly in Northern and Eastern parts of the country.



**Figure 5: Safaricom Coverage Map**

These various strategies have worked. Many informants noted that they remained loyal to Safaricom, even though it was common for them to have a second or third SIM. When asked why they remained loyal many informants explained that Safaricom tailored to, and served the needs of, the “common man”. They explained that before the MO came to Kenya, only the rich could afford mobile services. As was noted by one elderly man in Kibera:

When the mobile first came, we all thought it was for the mzungu [white person] or the rich. You wouldn't see guys in Kibera on the phone...Ten years ago this thing [mobile] was so expensive. You could sell the shamba [farm], your cattle, and you still could not afford. Even the airtime was expensive... Then Safaricom came and things changed. Now even the old mamas [old women] are walking around here and talking on their phones.

Many others explained that Safaricom was responsible for bringing the mobile to poor Kenyans, and in many ways they were right. As Safaricom started to grow, and their revenues started to increase, the potential value in the low-end segment of the market became very clear. The result, as mentioned above, was the entrance of several new players.

The value of Safaricom to Kenyans was made especially clear during the MO's initial public offering (IPO) in June of 2008. 10 billion shares, or 60% of Safaricom, were offered to the public. These were scrambled up quickly, and became over-subscribed by 500%. For many Kenyans, it was their first time investing in capital markets. Several informants in Kibera had taken a significant chunk out of their savings, or acquired loans from friends and family, to purchase the shares. They all wanted a piece of Safaricom and were not deterred by the minimum initial investment, which was 10,000 Ksh.

The dominant position of Safaricom in the market, and the strong presence of the brand, has been instrumental to the growth of M-PESA. The empirical findings will show that many started to use the application because they were familiar with and trusted the Safaricom brand. The empirical findings will also reveal that the opposite was also true—M-PESA drove the expansion of Safaricom by increasing mobile phone uptake. Some rural dwellers were given mobile phones so that they could receive cash directly from urban contacts. M-PESA also increased mobile phone usage patterns. Many asserted that they were using their mobile phones more often since adopting M-PESA to make, or receive, requests for money.

Besides driving mobile phone uptake, M-PESA also increased the revenue streams of Safaricom. This was made clear in Safaricom's 2009 year end results. This finding is important because it makes clear the impacts that are generated when two systems interact. It also shows that a subordinate system can also expand the dominant one if engineered correctly. In this case, Safaricom shaped M-PESA to suit their customer loyalty and retention strategies. Such strategies were vital for Safaricom to gain and retain their market share in an increasingly competitive environment.

### ***3.2 The elements of the M-PESA system***

Now that the environment has been explained, the system elements can be delineated. This will set the context for the next section, which discusses the evolution of M-PESA and makes clear the strategies taken by the system builders to integrate the system into its environment. It must be made clear that the list of elements presented here is not inclusive. Rather, the section discusses the elements that constituted the system at an early stage of development. However, this not what the system looks like today. As will be made clear later in the Chapter, M-PESA is constantly growing and changing shape. Appendix G represents a diagram of the early system with most of its elements. The relationship between the different elements is also made clear in the diagram.

## ***Users***

The empirical findings identified two types of users. The first were the urban migrants who used M-PESA mainly to send money home. The second were the rural dwellers received cash from their city contacts. The majority of the users had a mobile phone before the application was introduced. As was mentioned above, many were also Safaricom customers. The users will be discussed in more detail in Chapter 4.

## ***Agents***

The fieldwork also identified two types of agents—the retail and the super. The main function of the retail agents was to provide cash-in and cash-out services to the customers. They also provided customer support. The super-agents were responsible for balancing cash and e-money requirements of the retail agents. They did this by making deposits (purchase e-value) or withdrawals (sell e-value) into the Central Bank of Africa (CBA) where all of the M-PESA funds were stored. The agents used a mobile phone to conduct the cash in and cash out transactions. They were further provided with their own PIN and electronic account. This made it easier to resolve issues relating to imbalanced cash and e-money floats.

As mentioned in the introduction, there are over 10,000 of these agents in Kenya. These agents are located in small shops, petrol stations, banks and post offices. There is a high concentration in Nairobi and other urban centres. Many are also located in the villages. Safaricom estimates that almost half of their agents are located outside urban centres.

## ***Agent commission structure***

An agent commission structure was also integrated into the system. This structure rewards retail and super agents differently. Retail agents receive a commission (80 Ksh) for each new customer signed up. They further receive 70% of the commission for cash in/cash out transactions. The other 30% goes to the super agents who balance the cash and e-money floats. Safaricom receives commission when customers “do something with the money”; that is, if customers make a money transfer or pay a bill. As will be described below, such a structure was vitally important to the growth of the agent network and customer base.

## ***The pricing structure***

The design of the pricing structure was kept simple. Fees for each transaction are fixed and taken off of the customers account directly. These fees are displayed in Table 8.

Transaction Type	Transaction Range		Cost (KSH)
	MIN	MAX	
Deposit Cash	100	35,000	0
Send money to registered M-PESA user	100	35,000	30
Send money to non M-PESA user	100	2,500	75
	2,501	5,000	100
	5,001	10,000	175
	10,001	20,000	350
	20,001	35,000	400
Withdraw cash by registered M-PESA user	100	2,500	25
	2,501	5,000	45
	5,001	10,000	75
	10,001	20,000	145
	20,001	35,000	170
Withdraw cash by non M-PESA user	100	35,000	0
Buy airtime [for self or other]	20	10,000	0
Change PIN	N/A	N/A	20
Show balance	N/A	N/A	1
Customer registration	N/A	N/A	0

**Table 8: M-PESA Fee Structure**

Customer registrations and deposits are free. The customer is only charged for doing something with the money, such as making a transfer or paying a bill. In the case of money transfers this charge is banded and depends on two factors—the amount sent and whether the recipient is registered. For example, it costs 30 Ksh to send 15,000 Ksh to a registered user. If the user is not registered then the same transaction will cost 350 Ksh. There is a charge for the withdrawal of cash. For the registered user this fee is banded and depends on the amount withdrawn. For the unregistered user the withdrawal is free.

## SIM and STK

Customers initiate a transaction via a menu that sits on their mobile phone. This menu is offered in two languages—English and Kiswahili. When the customer is registered, the menu is uploaded onto their SIM card. The menu prompts users to enter information (transaction type, amount, PIN etc.). Once all the necessary information is gathered, it is processed through a text message. Figure 6 illustrates the numerous steps that are required for each transaction to take place. M-PESA is run by an application called the SIM Toolkit (STK). This technology consists of a set of commands that are programmed into the SIM card. It sits on the mobile phone, which makes it easier to alter or upgrade menu options.

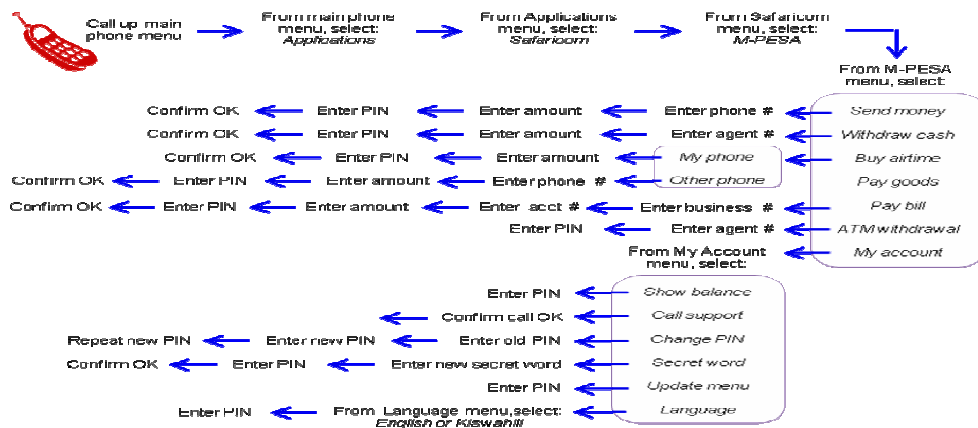


Figure 6: Menu Structure Used to Initiate Transactions (Mas & Morawczynski, 2009)

## Web interface

A web interface is used to administer the entire M-PESA system. As Figure 7 illustrates, this interface provides real time status of the transactions that are occurring in the accounts. It facilitates customer care administration, float management (cash and e-money), and transaction audits. A variety of reports can also be produced using this interface. This makes it easier for super-agents to monitor the operations of the retail agents. It also allows head office to monitor the transactions that are going through the system and identify any suspicious activity. The interface is also used to reverse any erroneous transactions, such as the agent depositing money into the wrong customer account.

Home Transaction Search Create Account Send SMS Reports System Reports

Customer: Orlando Bloom (254725099907) Activity Log  
Manage

Net M-PESA Net Safaricom Agent

Account Summary Payments Edit Account Activity Log

### Agent - Statement For Float Account Download Statement Print Statement

Select Start Date: 1 March 2006 00:00

Select End Date: 17 March 2006 23:59

Select Page Size: 10

Select transaction type:  Completed  Pending  Failed  All

**Go**

Current Balance	63113.00/-	Account Number	11-5
Uncleared Funds	0.00/-	Account Status	Active
Reserved Funds	0.00/-		
Available Funds	63113.00/-		

[Show Account Rules](#)

Receipt Number	Date	Details	Transaction Status	Withdrawn	Paid In	Balance
AC087	17-03-06 11:37	Paid cash to Customer Johnny Depp (254725099919)	Completed		1000.00	63113.00
AC086	17-03-06 11:37	Paid cash to Customer Brad Pitt (254725099913)	Completed		1500.00	62113.00
AC085	17-03-06 11:37	Paid cash to Customer George Clooney (254725099909)	Completed		1000.00	60613.00
AC084	17-03-06 11:37	Paid cash to Customer Sean Bean (254725099908)	Completed		800.00	59613.00
AB560	08-03-06 13:20	Agent Balance SMS requested Executed by operator Seb	Completed		0.00	58813.00
AB528	07-03-06 17:31	Cashed voucher with Agent (447974422331)	Completed		150.00	58813.00
AB522	07-03-06 17:19	Deposit received from George Clooney (254725099909)	Completed	-1500.00		58663.00
AB521	07-03-06 17:17	Paid cash to Customer George Clooney (254725099909)	Completed		50.00	60163.00
AB517	06-03-06 22:08	Paid cash to Customer George Clooney (254725099909)	Completed		550.00	60113.00
AB374	01-03-06 08:50	Cashed voucher with Agent (254722511982)	Completed		501.00	59563.00

1 2

**Figure 7: Web Interface**

### ***The SMS receipt***

Each of the transactions is confirmed via an SMS receipt. The receipts for a deposit and money transfer transaction are shown below in Figure 8. Both provide information about the transaction including: date and time, type, amount transacted, and balance in the account. These receipts are sent to each individual involved in the transaction. For example, the receipt for a money transfer is sent to the agent, sender and the recipient. Safaricom also has a record of this transaction via the web interface. Each of the transactions is given a unique identifier, which is used for subsequent transactions (i.e. withdrawals) and dispute resolution. For money transfers, the confirmation SMS has the name of the recipient. This validates that money was sent to the right person. Because the phone number of the recipient has to be physically punched in for each transaction (see diagram 1), the application is sometimes prone to error. If even one digit is not properly entered then money can be sent to the wrong person.



### Confirmation SMS for deposit

G57GG043 [receipt number]  
Confirmed on 20-4-09at4:50pm [transaction date]  
Give kshs.1555cash to Olga Morawczynski [name of account holder]  
Kakamega [place of withdrawal]  
new M-pesa balance is ksh. 1555 [M-PESA account balance]  
sender M-pesa  
message center  
+254722 500000 [number of customer]

### Confirmation SMS for money transfer

G57GVI40 [receipt number]  
confirmedksh.1500 [amount sent]  
send to  
Ignacio Mas [recipient]  
254715 00000 [number of recipient]  
on 20-4-09at 4:56 [date and time of transaction]  
new M-pesa balance is 20 [balance in M-PESA account]  
sender M-pesa  
message center  
+254722 500000 [number of sender]

**Figure 8: SMS Confirmation Receipts (Mas & Morawczynski, 2009)**

### ***DFID, FDCF and Coffey***

DFID is the sector of the UK government that manages aid to resource poor countries and works to eradicate “extreme poverty” (DFID, 2009). It is organized around a number of key initiatives, from improving access to health services to peacekeeping. The extension of financial services to the resource poor is also a priority and a variety of funds have been focused around such a goal (DFID, 2007). The Financial Deepening Challenge Fund (FDCF) is one example. This fund was launched in April 2000 and £15 million was given to twenty-eight projects in Africa and Asia. The grant sizes varied between £500,000 and £1,000,000. It must be noted that the FDFC did not simply donate money. Rather, it worked with private sector organizations to meet the specified goal. These organizations would share 50% of the total project cost. Such a strategy increased the total grant size to £56 million. The FDFC was one of several challenge funds that relied on public-private partnerships. This engagement with the private sector was meant to catalyze market activity where it was non-existent. It was also meant to provide financial products to the resource poor at scale. According to DFID (2009), such products were vital to the elimination of poverty.

The fund was managed on behalf of DFID by Coffey International Development, a consultancy service operating in over 80 countries. In this role, Coffey was responsible for

promoting the fund, managing the bid process, contracting bidders, evaluating their progress and reporting such progress back to DFID.

### ***Vodafone and Sagentia***

The London based Vodafone group is one of the world's largest telecommunications companies. It has significant presence in Europe, the Middle East, Africa, Asia Pacific and the United States through joint ventures, subsidiary undertakings, and investments (Vodafone, 2009). In September 2009, the group had over 323 million customers. As was mentioned above, the company has a 40% share in Safaricom.

Sagentia is an international technology consulting firm that is based out of Cambridge. According to the website, its heritage is closely linked to the "Cambridge phenomenon"—the high technology cluster that emerged around Cambridge University in the 1980s. The company supports a variety of large clients, from Vodafone to Häagen-Dazs.

### ***Faulu Kenya***

Faulu is a deposit taking Microfinance Company. It began in 1992 with a pilot phase of micro-lending in Mathare, an informal settlement in Nairobi. With funding from DFID and US AID, the company extended its lending activities to other informal settlements and low-income communities around the country. Currently, the company has over 90 outlets throughout Kenya, which serve over 250,000 clients (Faulu, 2009). The company offers a variety of credit and savings products. It relies on the Grameen group lending structure.

### ***Commercial Bank of Africa***

The Commercial Bank of Africa (CBA) is the largest privately owned bank in the country. It has its headquarters in Nairobi but also has branches in Meru and Mombasa. The CBA focuses mainly on corporate and institutional banking but also provides personal banking services. As was mentioned above, the cash that banks the electronic value is stored in the CBA.

## ***3.3 The story of M-PESA***

Now that the environment and system elements have been introduced, the story of M-PESA can be told. As this section will make clear, M-PESA grew because it had a dedicated team of system engineers. These individuals undertook a variety of strategies to grow the system.

They also worked to maintain stability by diverting, or in some cases integrating, hostile external forces.

### **3.31 The initial idea**

The story of M-PESA began at the World Summit on Sustainable Development (WSIS) in 2002. This summit was attended by Nick Hughes, who was the first system builder. Hughes was a Vodafone executive and head of Corporate Social Responsibility. One of his primary roles was to understand just how Vodafone could help in meeting the MDGs. Because of this role, he was invited to speak at the summit about how private sector organizations could foster long-term sustainable development. At the time, there was a significant amount of interest in this area amongst development practitioners. Such interest was made clear in the numerous UN documents that called for “global partnerships for development”. ICT expansion was also a focus. In fact, one of the targets of the MDGs was to cultivate partnerships that facilitated technological outreach. This is probably why Vodafone was invited.<sup>10</sup> The company was also expanding their operations into various emerging and developing markets. This is probably why they attended. Aside from Kenya, they also had presence in Tanzania, Egypt, and South Africa.

After his session, Hughes was approached by a representative from DFID. They discussed the numerous barriers that companies such as Vodafone faced when engaging in development projects. Because such organizations were legally bound to maximizing shareholder capital, development initiatives were usually squeezed out. This is where challenge funds became vitally important. They could be used to overcome the internal competition and raise awareness for a new service. The donor informed Hughes of the FDCF and suggested that he put in a bid. He made clear that many of the other successful applicants were large and well known private sector companies that faced similar internal barriers to the development of new services (Hughes & Lonie, 2007).

Hughes spent the next few weeks putting together a proposal. Whilst doing so, he focused on two things: broad support for the project from the senior executives in the company and the buy in from his East African colleagues. The donor made clear that this was the target zone for the FDFC. Such a target zone also fit in well for Vodafone who had a presence in both Kenya and Tanzania. The representatives at Coffey were vitally important for the early

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<sup>10</sup> Target 8f states that the benefits of new technologies should be made available in collaboration with the private sector. See UNDP (2008).

development of the concept. Hughes had little experience in the area of financial services. He had also spent most of his time working in developed markets. He thus relied on Coffey to make clear the needs of the financial sector in East Africa.

Hughes eventually handed in a short concept note, and thereafter longer proposal. Such a proposal detailed the need for a preliminary needs assessment rather than providing a functional specification for a new product (Hughes & Lonie, 2007). This proposal took some individuals at DFID and Coffey by surprise. At the time, not too many MOs wanted to enter the financial services space in resource poor countries. Despite some initial reservations, the proposal was approved. Hughes enrolled another vital element into the system—the money from the FDCF. This was matched equally by Vodafone. The external funding provided by DFID helped Hughes to raise awareness and interest in the project.

Soon after receiving the money, Hughes enrolled another actor into the system. His name was Paul Makin and he was from a consultancy firm called Consult Hyperion, which specialized in contactless and micro-payments. The two travelled to Nairobi and Dar es Salaam for a series of exploratory workshops. Through their contacts at Coffey, they were put in touch with several financial institutions, NGOs, and regulators. This helped them to identify two some key needs within the industry. The first was expansion of reach. The financial institutions, in particular, were looking for innovative ways to enrol new customers. They were also looking for ways to improve their internal management and increase the efficiency of their operations. Hughes and Makin used this information to sharpen their value proposition. They proposed an application that facilitated the disbursement and repayment of micro-loans.

With the value proposition in place, the two needed to pick a location for the pilot. They also needed to partner with an MFI. Eventually, the decision was made to enrol Faulu Kenya into the system. The MFI had a substantial presence within resource poor communities. It also had a previous relationship with both DFID and Coffey. As a result, it was an appropriate choice for a partnership. As a location, Kenya also made sense. The inequalities described above made it suitable place for a DFID funded development project. The regulators were also more willing to engage in discussions than their Tanzanian counterparts. This is probably because they were looking for new ways to expand the reach of financial services and experimenting with numerous branchless banking strategies. The mobile, as a pervasive technology, could be implicated in such strategies. The presence of Safaricom was also a

deciding factor. The previous section made clear that the MO was well positioned in the market and had captured a significant customer base. Such a presence would be vital for the scalability of the system. With these various institutions and elements in order, Hughes and Makin proceeded to the pilot phase.

### ***3.32 The pilot***

The system grew considerably, in terms of both size and complexity, during the pilot. Hughes enrolled Susie Lonie, a senior project manager at Vodafone, to head the pilot. She also acted as a vital system builder and spent most of her time on the ground in Kenya. Hughes and Makin worked remotely from the UK. One of the first decisions made by Lonie was to outsource the development of the application. After spending time examining the alternatives in the market, Lonie decided that none suited the value proposition. Many of the available options were designed with “Western” banking infrastructure as their main point of reference. The decision was thus made to issue a request for proposal (RFP). Such a request was won by the consultancy firm Sagentia. Although the company had little experience with “banking business” it was chosen because they had a very flexible approach to design. Several members of the Sagentia team joined Lonie in Nairobi. A few junior level staff members from Safaricom also became involved. However, the MO did not dedicate a larger team of employees to the project. At the time, Safaricom was focused on expanding their customer base and offering voice and text services. Engaging in a complex project alongside their daily operations was not feasible.

As the pilot proceeded, a variety of design decisions were made. For example, the team had to figure out how to get cash in and out of the system. Initially, point of sales (POS) devices were considered. Customers were to be given magnetic stripe cards to use at these devices. However, this approach was too expensive. It also did not allow for scalability. Instead, it was decided that the application would use the SIM application toolkit (STK) system, which situated M-PESA on a SIM card. It was chosen because it was more secure than the other available options. The pilot team made clear that security was one of the major concerns during the early stages of development. This is especially because the system was transferring money. If one of the elements failed, and customers could not access their cash, this could result in system degradation. The STK also facilitated scalability as it was situated on the mobile phone.

With these elements in place, 500 borrowers were enrolled to participate in the pilot. Each of these borrowers was given a phone with the M-PESA menu. Such enrolment occurred in three different settings; the central business district in Nairobi, the informal settlement called Mathare, and market town called Thika. The MFI participated in the pilot because they were looking for ways to cut the costs associated with loan repayments (travel, time etc.). However, not long after the pilot began some problems emerged within Faulu. As a result, the MFI became a reverse salient and threatened the stability of the entire system.

Faulu worked on the Grameen group based method. Such a method was characterized by group rather than individual loans. It was also characterized by weekly meetings, which were used for purposes of loan repayment and financial education. The staff at Faulu observed that the introduction of M-PESA altered the dynamics of group cohesion. More specifically, attendance at the weekly meetings went down. This is because some members started to repay their loans remotely via M-PESA. For Faulu, this was problematic. The MFI used the meetings to teach members how to organize their finances. The staff made clear that such lessons decreased the risk of members “diverting” their money.

Another problem also emerged. The M-PESA system required that Faulu upload all transactions onto a website that tracked cash flows. This resulted in a lot more work for the staff; they had to record the transactions both manually and electronically. Because of these issues, Faulu became a reverse salient. They decided not to proceed with the pilot and launch with M-PESA.

### ***3.33 A change in concept***

The loss of Faulu did not result in the degradation of the system. The builders reassembled the elements by focusing on a new value proposition—send money home. Such refocusing occurred because the pilot team made some interesting discoveries in regards to unanticipated usages. More specifically, they observed that many participants were using M-PESA for person-to-person (P2P) transfers, business purchases, and savings. Some were also sending airtime purchased via M-PESA to their relations up country. Based on this knowledge, the pilot team redesigned the technological script for money transfers. They also refocused their main value proposition to send money home.

Given the context of the system, such refocusing made sense. The previous section made clear that many Kenyans are heavily reliant on remittances for their livelihoods. This is

because of wage differentials and high rates of unemployment in rural areas. It also made clear that roads are poor outside of major urban centres. This makes it difficult and time consuming to physically move cash across the country. The penetration of banks in rural areas is also low. This means that money transfers via bank accounts are also not feasible. Because of such deficits, it made sense to introduce a mobile money transfer product into the market.

Numerous changes had to be made to the system as a result of such refocusing. For example, the user interface was altered to integrate the new usages—deposits and withdrawals, money transfers, and the purchase and transfer of airtime. The customer pricing structure was also adjusted to suit money transfers in resource poor communities. For example, deposits were not charged. This reduced the costs of customers “testing out” the system. The structure was also designed with scalability in mind. Customers could send money to non-registered users, even those who were not Safaricom subscribers. However, the charge for making such a transfer was much higher when the recipient was not registered. The empirical findings will reveal that these pricing decisions were vitally important to the expansion of the system. Many urban migrants convinced their rural relatives to sign up with M-PESA to circumvent the higher transfer charge. The confirmation SMS was also integrated. This provided both the customer and agent with evidence that a transfer was made. A copy of each transaction also went through the web interface. Such tracking was important to dispute resolution.

The system was also altered to reflect the regulatory environment. To avoid the risk of system degradation, Hughes enrolled the UK Financial Services Authority (FSA) before the pilot was launched. The FSA thereafter approached the CBK to discuss M-PESA. Several of the informants noted that FSA was a vital intermediary. They provided the CBK with advice throughout the development of the system. As a result, the CBK was more aware of the risks associated with the application and remained supportive throughout the development phase. In fact, the CBK even adapted the regulatory environment to facilitate the growth of M-PESA and similar services. They did this through the development of the National Payments System (NPS) Bill, which classified M-PESA as a payments service provider rather than a deposit taking institution that was conducting “banking business”. If M-PESA was classified as the latter they would need a banking license to operate. The NPS bill put M-PESA under

the jurisdiction of the CBK as a payments service provider and made it subject to inspections and reporting.<sup>11</sup> It is expected to be passed into law in 2010.

The CBK had several stipulations before allowing the pilot to go live. This further altered the design of the system. For example, they wanted to mitigate the risk of money being lost. As such, they asked that every Kenyan shilling of e-money be backed by cash in a bank. This led the pilot team to enrol the Commercial Bank of Africa (CBA), which held the M-PESA cash float. The design team also took several measures to avoid being categorised as a deposit taking institution during the design phase. For example, they outsourced their deposit taking activities to the agents. There was nothing in the banking act that specifically addressed such outsourcing. Instead, it was dealt with by the CBK on a case by case basis. KYC requirements were also integrated. Customers had to show their ID when signing up and conducting transactions.

AML/CFT was also considered. Limits were put on how much could be held in an M-PESA account (50,000 Ksh), and on amounts transacted (35,000 Ksh). Such caps decreased the likelihood that M-PESA would be used for money laundering. They further decreased the amount that a customer could lose in cases of insolvency. All of these changes were made because the pilot team was in frequent communication with the CBK and understood their concerns. Such processes of alteration are interesting because they make clear the amount of effort that was put into making the M-PESA system adaptable to its environment. Such adaptability is one of the major reasons for the stability and growth of the system.

### ***3.34 Enrolling Michael Joseph***

With the new value proposition, the pilot team worked on gaining the support of Safaricom to launch the product. To do this, they had to enrol Michael Joseph, the CEO of Safaricom. Although Joseph was supportive from the beginning of the pilot, he did have his reservations about the system. In particular, he questioned whether M-PESA would beat out sambaza, the application that facilitated the transfer of airtime. Lonie spent a considerable amount of time discussing the value proposition with Joseph. She eventually managed to enrol Joseph into the system by convincing him there was a mass market potential for the product. It is also likely that Joseph recognized M-PESA as vitally important to customer retention strategies.

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<sup>11</sup> It will further have a set of clearly defined rules regarding Anti-Money Laundering (AML) and Combating Financial Terrorism (CFT) regulation.



As was mentioned previously, there was a significant amount of competition within the mobile telephony space.

Once enrolled, Joseph also acted as a system builder and assigned a team within Safaricom to lead M-PESA. It was headed by Pauline Vaughan, who previously worked as the head of new product development. Vaughan took over from Lonie as the main system builder. She worked with the marketing team at Safaricom to develop a marketing strategy that emphasized the new value proposition.

Back in London, Hughes continued to be a valuable systems builder. The support of the executive committee at Vodafone was needed if M-PESA was to move from pilot to launch. For this to occur, Hughes had to get his pitch past “Brocket Hall”. This was an annual meeting for Vodafone executives during which new product and service ideas were launched. Hughes’ pitch was successful, and he managed to enrol the executive team. With the support of both Safaricom and Vodafone, the application was introduced into the Kenyan market.

### **3.35 The launch**

During the launch, the focus was put on two things—expanding the agent network and enrolling new customers. Both were vitally important to the system. Agents needed a customer base to remain profitable; customers needed easily accessible agents. Safaricom thus took what Joseph refers to as a “McDonald’s” strategy, and focused on the mass penetration of the agent base. They wanted to ensure that customers had multiple points at which they could cash-in and cash-out. The formation of partnerships was central to this strategy. The Safaricom team enrolled a number of organizations to act as agents (see Appendix H for a comprehensive list). This includes grocery shops, petrol stations, MFIs and SACCOs. Some larger financial services providers were also vital to the growth of the agent base. This includes Equity bank, which has made M-PESA available in over 90 of their branches. It also includes PayNet, an ATM service provider that facilitates M-PESA withdrawals at 110 ATMs around Kenya.

It must be noted that Safaricom did not flood the market with agents. Rather, they maintained an orderly growth in the number of agents, in relation to the growth in their customer base and the number of transactions flowing through the system (Mas & Morawczynski, 2009). This is illustrated in two graphs in Figure 9. The one of the right

illustrates the key ratios between the three variables. The growth shows index numbers, such that the data in each month for a given variable or ratio is expressed relative to the corresponding value of that variable or ratio in the last month for which data is available (i.e. February 2009=100) (Mas & Morawczynski, 2009). This was most likely done to avoid reverse salients. The growth of the agent network would be stalled if agents in operation did not remain profitable. The focus on maintaining steady customer/agent growth ratios made sense. The result—agent profitability grew over time as is illustrated in the transfer/agent ratio. Since agents made profit per transaction, increased transactions meant greater profits. This example makes clear how system elements were complementary. Both the agent commission and pricing structure were designed to maximize growth.



**Figure 9: Monthly Growth in the Number of Registered Customers, Number of Authorized Retail Agents, and the Value of P2P Transfers (Mas & Morawczynski, 2009).**

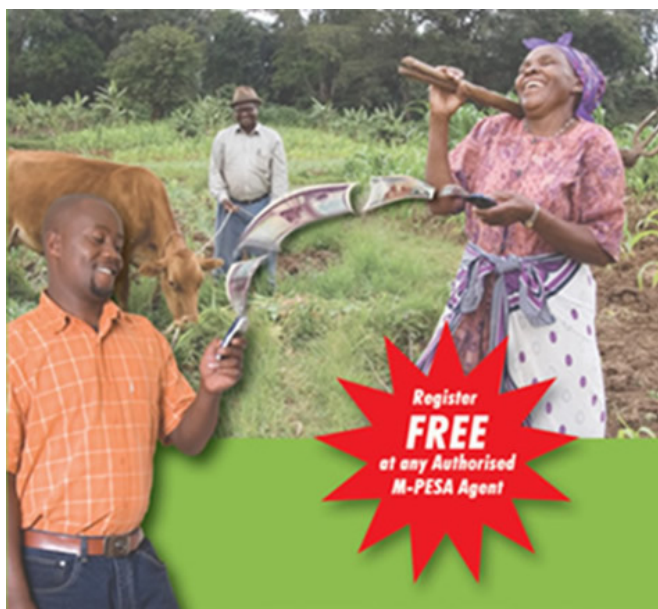
Safaricom also took measures to ensure agents were profitable even before there was an established customer base. They designed commissions for customer registration into the system. At first, 80 Ksh was given for each customer registered. However, the Safaricom staff soon learned that this had its unintended consequences. Some of the agents focused on the quantity of customers registered and did not properly complete the registration process. This put a burden on other agents to fix the problem. Safaricom eventually split their commission structure—40 Ksh was given at the time of registration, and the other 40 Ksh after the customer made their first deposit.

Besides managing the growth of the agent network, Safaricom also gave attention to agent liquidity (Mas & Morawczynski, 2009). Such liquidity was vitally important for the

functioning of the entire system. Customers could not transact if they could not get cash in and out of the system. Safaricom enrolled over 300 super-agents in this effort. These super agents managed the floats of the retail agents under their control. Such an agent structure was vitally important to the scalability of the M-PESA system. It allowed the agent base to expand rapidly because Safaricom delegated the responsibility of reverse salients (cash and e-money float shortages) to the super-agents. This structure has also made it easier for agents to penetrate areas that are under-served by financial institutions and money transfer services. This is why there are eleven times more M-PESA agents in Kenya than there are bank branches.

### ***3.36 Expanding the customer base***

The launch was also accompanied by an extensive marketing campaign. Initially, such a campaign was kept simple. The “send money home” value proposition was emphasized and there was a focus on capturing the urban-to-rural remittance flows. Two types of users were targeted—the urban sender and the rural recipient. Figure 10 depicts an advert that was used in the early M-PESA promotions. It shows a young man, dressed in urban attire, sending money a rural farming community. The “send money home” application was something that was understood by most Kenyans. As was made clear previously, there was a well developed remittance economy in the country. This was mainly due to wage differentials and urban-rural dependencies.



**Figure 10: “Send Money Home” Marketing Ad**

Eventually, the Safaricom team decided to change their marketing strategy. This was done to enrol more customers into the system. In Figure 11, some of the more recent adverts have been included. They show a man laying on the beach, a woman selling fruit in the market, and a pilot standing by his plane. These adverts provide a clear message—M-PESA is for everyone. They also make clear that it can be used in several ways beyond the money transfers back home. Such a decision was probably made to increase the volume of transactions. As was made clear previously, Safaricom earned a commission every time that customers moved money through the system.

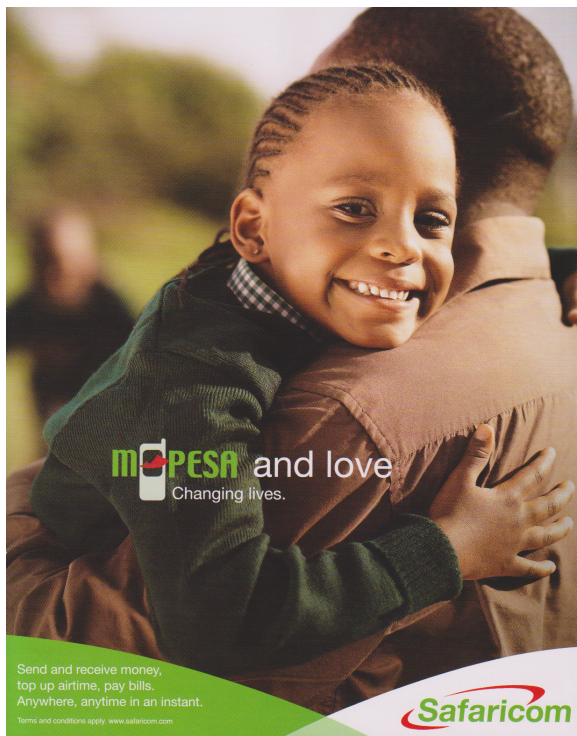


**Figure 11: “M-PESA is for Everyone” Marketing Ads**

To go beyond the “send money home” value proposition, the Safaricom team began to enrol a variety of partner organizations. The extensive list of partners, and a description of how they are using M-PESA, is in Appendix H.<sup>12</sup> This allowed the service to be used for a variety of purposes. This includes bill (electricity, grocery, insurance etc.), salary and social payments. It also includes donations to charitable organizations and the repayment of MFI loans. The extension of functionality was key to the latter strategy of customer growth. The Safaricom team focused on developing a “mobile money eco-system” instead of a money transfer service.

<sup>12</sup> It must be noted that the list provided here is not inclusive, as the partnership base is constantly growing. However, it is meant to illustrate that M-PESA has become a platform for a wide variety of other services.

More recently, the marketing campaign is emphasizing the symbolic rather than practical function of money transfers. As is shown in Figure 12, the adverts link M-PESA to love. They present the application as a tool for nurturing family, as the young girl hugging her father illustrates. The move towards such emphasis is especially interesting. The empirical findings will reveal that money transfers had a vitally important symbolic function. By sending money home, urban migrants were maintaining their ties with the village. The marketing team recognized and exploited such symbolic value to expand the user base.



**Figure 12: M-PESA and Love**

A significant effort was made during the marketing campaign to tie the M-PESA brand to that of Safaricom. All of the adverts were bright green, the colour of Safaricom, and displayed the MO's logo. The M-PESA logo was also similar to that of Safaricom, as is shown in Figure 12. This made it easier for customers to recognize that these two brands were related. M-PESA retail agents were also required to display Safaricom branding. In many cases, the entire shop was painted green. This made it easier for customers to locate the service. It also facilitated the growth of trust relations between the customers and agents. As the empirical findings will show, customers initially did not trust the agents. They continued to use M-PESA because they trusted Safaricom. Such marketing strategies are

vitaly important to recognize because they make clear how the M-PESA system builders utilized their over-arching system to instigate growth.

### ***3.37 The reverse salients***

As M-PESA grew it faced another reverse salient. The commercial banks in Kenya reacted negatively to the fact that M-PESA was not regulated. In fact, these banks put a significant amount of pressure on the CBK to “freeze” the system (Nyabiagep, 2009). They argued that funds held in an M-PESA account were at a significant risk of loss. There was no regulation in place to protect the customers against a loss. The CBK responded and assigned the Treasury to perform an audit of M-PESA. In January of 2009, the results of the audit were announced. The Treasury concluded that M-PESA was both “safe and reliable” (Nyabiagep, 2009). They further noted that they would continue to oversee the development of the system. Such a finding illustrates the strength of the M-PESA system. The builders had enrolled the CBK at an early stage of development to circumvent such a situation. They also aligned the various elements in a way that they withstood the threat of disassociation by hostile external forces.

### ***3.38 Usage patterns after launch: The results of a nation-wide survey***

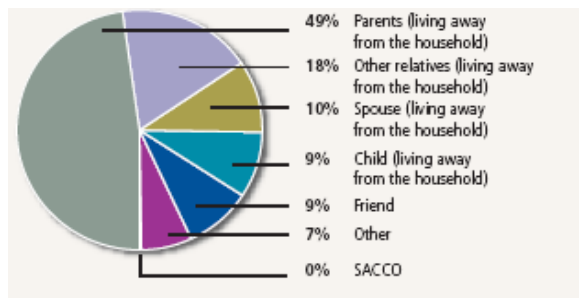
With the system elements in place and the reverse salients under control, customers were enrolled in the M-PESA system and it began to grow. Eventually, the system became more stable. The web of elements became seamless, and the reverse salients less threatening. The next step is to examine how this heterogeneous system shaped adoption and usage patterns across Kenya. FSD, did just that by surveying 3000 homes in Kenya from August to October of 2008 (Leishman , 2009).<sup>13</sup> The findings that emerged from these studies are depicted in Figure 13. The first is related to mobile phone ownership. It was found that 80% of M-PESA users had a mobile phone. The majority of those who did not own a phone claimed to have access to one. This confirms that the mobile was a vitally important part of the system. The M-PESA application was dependent on this element for its growth. Furthermore, 91% of the mobile phone owners used Safaricom as their primary SIM. This also confirms that mobile money applications are vital to customer retention strategies.

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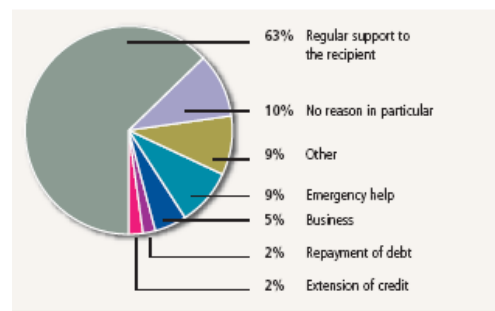
<sup>13</sup> These homes were randomly picked from districts that accounted for 92% of the total population in Kenya. As such, the results provided a general overview of M-PESA usage across the country.



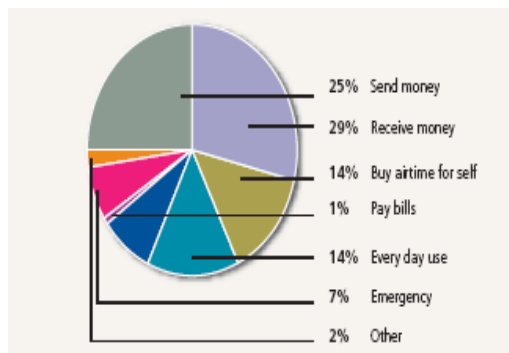
### Money Transfer Recipients



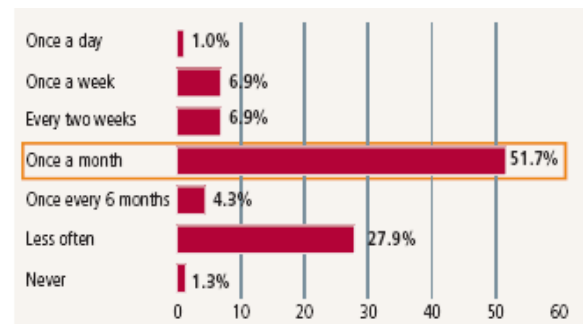
### Purpose of Money Transfer



### Primary use of M-PESA



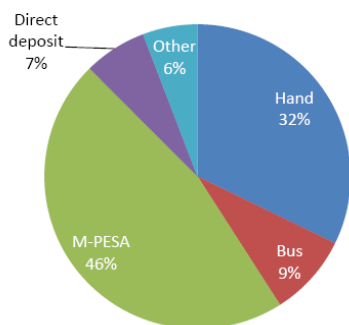
### Transfers made per month



**Figure 13: M-PESA as a Money Transfer Mechanism**

In regards to usage, the study found that M-PESA was mainly being used for the transfer of money. 77% of users were sending money to relatives (parents, spouse, other). In 63% of the cases, these transfers functioned as regular income support. Over half of the sample transacted on a monthly basis. A small segment was more active and transacted on a bi-weekly (6.9%), weekly (6.9%), or daily (1%) basis. This finding is interesting because it makes clear that the value proposition was well understood by the customer base. It also shows that the pilot team made M-PESA suitable to the environment in which it existed. M-PESA was also being used for other purposes such as the purchase of airtime (14%), everyday use (14%), and emergencies (7%). Only 1% claimed to use M-PESA to pay bills. This could be because the survey was conducted when M-PESA’s partnership base was much smaller.

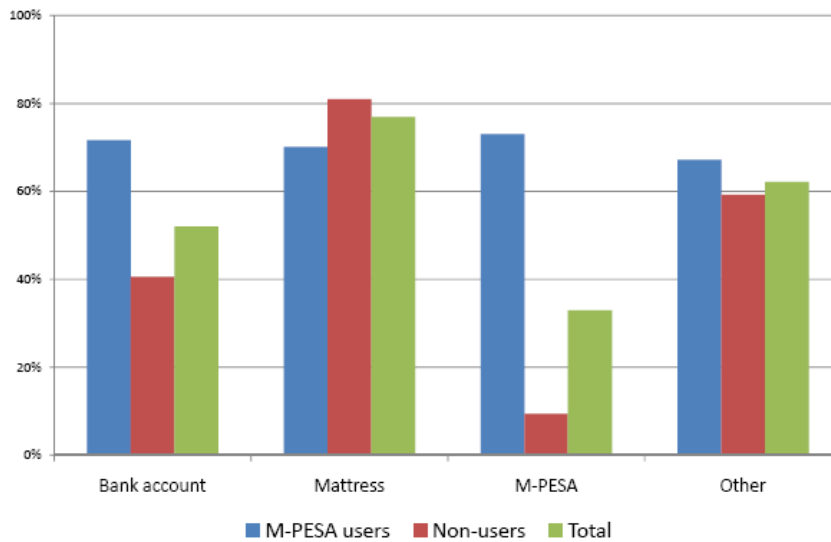
The study further found that M-PESA was a substitute for other money transfer services. As is shown in Figure 14, 46% of the sample used the application to transfer money. Others preferred transfer by hand (32%) or bus services (9%). This differs drastically from the results of an FSD study (2007) conducted before the launch of M-PESA. This study revealed that most sent money by hand (58%) or via the bus and matatu company (27%). Such results are interesting because; they illustrate that M-PESA also impacted other systems in its environment. More precisely, it displaced many of the other popular money transfer services.



**Figure 14: Popular Money Transfer Options in Kenya**

The results of the survey also revealed a significant unintended usage—savings. As is shown in Figure 14, a large portion of M-PESA users kept a balance in their M-PESA account. However, they did this in conjunction with other mechanisms. On average, M-PESA users spread their money over three savings devices. The most popular of these was the mattress and the bank account. The study also revealed a demand for other financial services. A large segment of the respondents (38%) wanted to earn interest on the savings stored in their M-PESA. Some also wanted to make ATM withdrawals with M-PESA (24%) and to access their bank account via the application (17%). Such demand is probably linked to the under-representation of financial institutions. As was made clear above, there were only .0022 branches per 100 people in Kenya.





**Figure 15: M-PESA as a Savings Mechanism**

These usage patterns are vitally important for the story of M-PESA. They make clear how a pervasive system can alter financial habits. It also shows how the technological script can be enacted in unintended ways. M-PESA was designed for money transfers. Because of the under-representation of financial institutions, it was also used for savings. This will be discussed in greater detail in the empirical findings.

### **3.4 Conclusion**

This chapter explained the growth of M-PESA using the systems approach. It outlined the various technical (mobile phone, web portal, STK) and organizational (Vodafone, DFID, Safaricom) elements that constitute the system. The diverse set of system builders that contributed to the expansion of M-PESA was also identified. This includes executives, designers, agents (super and retail) and consultants. Each of these actors undertook strategies to expand and maintain the system. In some cases, they enrolled key actors. In others, they managed reverse salients even before they emerged. The system builders also took strategies to align and relate the various elements of the system. For example, the design of the user interface and the pricing structure was tailored to the “send money home” value proposition. Also, the super and retail agents were aligned to facilitate the scalability of the agent network and to make it easier to move cash and e-money around the system.

The chapter also made clear that the environment shaped the trajectory of growth. It showed how the maldistribution of wealth gave rise to a remittance economy. M-PESA, as a money

transfer system, was useful in this context. The evolution of the political economy was also given attention as it shaped the financial and telecommunications sectors. Both of these were vitally important to the success of M-PESA. In regards to the former, the under-representation of financial institutions and money transfer services drove the adoption of the system. The resource poor were provided with a safer means to store and transfer cash. In regards to the latter, a telecommunications environment that fostered the growth of the mobile phone was vitally important. This is because M-PESA depended on the device as a platform. It also depended on established mobile telephony practices. Many found M-PESA easier to use because they had previous experience with the mobile phone.

The other systems in the environment that shaped the growth of M-PESA were also discussed. In particular, Safaricom was noted as influential. The dominant position of the MO in the market and its strong brand presence made it easier for M-PESA to reach and enrol customers. The opposite was also true. As M-PESA grew in size it also began to impact Safaricom. More specifically, the revenues of the MO increased because of M-PESA. The chapter ended with an analysis of usage patterns across the country. This was meant to illustrate how the system was adopted and used by Kenyans. It was also meant to show that M-PESA itself became a reverse salient. By capturing a wide portion of the remittance market, it destabilised the other money transfer systems.

One major lesson can be extrapolated from the analysis presented here—the growth of M-PESA cannot be attributed to one single factor. Rather, it is the product of numerous actors who appropriated a divergent set of strategies to propel growth and protect the system against degradation. Such growth can also be understood from the user's perspective. The next three chapters will make clear how the M-PESA system became integrated in the daily lives of the Kenyans. The chapters will also discuss the consequences that emerged as a result of such integration.

## **Chapter 4: Focusing on the User and Technological Practices**

### ***4.0 Introduction***

In the previous chapters, the growth of M-PESA was explained using the systems framework. The various elements (human and non-human) of the system were highlighted. The strategies undertaken by system engineers to align these elements and protect the system against degradation were also made clear. There are, however, important elements of the system that have not been given the appropriate attention within the socio-technical systems literature. This includes the user and non-user. It also includes the practices that emerge from, and are shaped by, the socio-technical system and its environment. According to Pfafenberger (1992) such an understanding is important because socio-technical systems are sites of purposive and meaningful technological practices. Such practices function not only to maintain the system, but also reproduce the entire social structure. Pfafenberger also makes clear that technological action is social in its nature; it allows users to reinforce, as well as challenge, hierarchies and power structures that exist within the system's environment.

If technological practices are social in their nature then a socio-technical system will grow more quickly if technical features fit into existing social practices and local systems of logic. As will be shown in this chapter, this was certainly the case with M-PESA. The system grew because it fit into already established remittance practices. Such practices were maintained because they had both a practical and symbolic function. In regards to the former, they provided a vital source of livelihoods for rural dwellers. In regards to the latter, they helped the urban migrants to make clear their ongoing commitment to the village.

The chapter will begin by discussing how the user shapes the various stages of technological development. The attention will thereafter be turned to technological practices; first with an analysis of how such practices have been conceived of within the STS literature and later with an identification of the various shortcomings of this approach. The chapter will then draw from practice theory and anthropology of technology literature. This body of literature emphasizes the social nature of technological practices. It further makes clear how such practices shape, and are shaped by, society. The empirical evidence will thereafter be presented. The users will be introduced in both sites, and the usage patterns identified and explained. The relationship between technological meaning and practices will be discussed. More specifically, the chapter will show how technological practices shape the meaning of a technology, and how changing technological meanings can alter practices. The work will

also contextualize these practices within a larger structure of borrowing and lending called entrustment. It will make clear that associated practices must be understood for the meaning of individual practices to be grasped. Bourdieu's concept of habitus will be used to frame this discussion. This concept is used to describe a set of internalized structures, which operate as a worldview and provide a moral framework for action. These structures are important to understand because they shape and govern practice. The chapter will end by identifying another important element to the socio-technical system—the non-user. The discussion will make clear that this segment can also alter the trajectory of development.

#### ***4.1 Focusing on the User***

The importance of the user has been emphasized in the STS literature in general and domestication literature in particular. Numerous studies have called for a user-focused analysis of technological change rather than a design-centered account of innovation (Cowan, 1987). The general argument is that users are not merely the passive recipients of the technology; they are also active agents of change who shape the trajectory of innovation (Kline & Pinch, 1996; Oudshoorn & Pinch, 2003). The literature also notes that the two spheres are co-constructed; users may shape the trajectory of innovation, but the technology also has an impact on their daily lives.

But who exactly are these users? Who defines them? The user has been conceptualized in numerous different ways across the STS literature and their technological activity has been examined at different points in time (Oudshoorn & Pinch, 2003). The social construction of technology (SCOT) theorists, for example, have conceived of users as social groups engaging in the construction of a technology. Usually, these studies focus on the early stages of development when users engage in processes of social construction. The focus ends after “stabilization” is reached and a predominant meaning and usage for the technology emerges. This focus, however, is limited. The empirical findings will make clear that technologies continue to be modified even after “stabilization” is reached. New uses emerge, and new practices are cultivated.

Some STS scholars have focused on how users are represented or configured by designers. This approach articulates the user as a reader of a technological text and emphasizes the interpretive flexibility of technological objects and processes that may delimit such flexibility (Oudshoorn & Pinch, 2003). It explains such configuration as a two way process. Designers configure users, and are in turn configured by users during the process of technological development. This approach was introduced in the last chapter, and used to

highlight the numerous design iterations that emerged from conceptualization to launch. This chapter will continue this discussion and make clear how the script was enacted in practice. It will also make clear how the readings of the script changed through time.

This approach does have a limitation—it under-emphasizes the social and cultural processes that shape how the technological script is read. Such processes are given a significant amount of attention in the domestication literature, which conceptualizes users as social actors who use technologies in culturally appropriate ways. Much of this scholarship draws its inspiration from anthropological studies of material culture. These articulate the importance of sign value, rather than just material value of things (Oudshoorn & Pinch, 2003). They also emphasize that objects have a central role in creating and shaping social relations and identities, as well as culture at large. This approach will be appropriated in this chapter mainly because it elucidates the broader set of relations that impact user-technology interaction. It also makes clear the various human and non-human elements that impact this process. This allows for an analysis of technological development from conceptualization to development and beyond (Oudshoorn & Pinch, 2003).

#### ***4.2 The domestication framework***

Much of the domestication literature focuses on understanding how technologies become integrated into daily life, which has been defined as the non-routine, non-specialized and non-bureaucratic activities (Oudshoorn & Pinch, 2003). During this process, the technologies are transformed from “unfamiliar, exciting and possibly threatening things” into something familiar (Oudshoorn & Pinch, 2003). This occurs at two levels—the practical and symbolic. At the practical level, new patterns develop as the technology is integrated into everyday routines. At the symbolic, meanings are attached to technologies in relation to the needs and competencies of the user. The literature makes clear that technological meanings are often contradictory. For example, Livingstone (1992) examined domestication within the household and found that new technologies often became points of contention, especially between men and women. Such contention occurred because family members attached different meanings to the same device. The types of meanings attached impacted both the nature and frequency of usage (Lie & Sorensen, 1996; Oudshoorn & Pinch, 2003).

The literature notes that domestication is an ongoing process. A change in technical characteristics can engender changes to meanings associated with the technology. This can happen if a new application is installed on the device; it can also occur when a new usage is discovered for the technology. In both of these cases, new meanings and practices emerge.

The literature further notes that domestication is a dual process. When new technologies are integrated into daily life social arrangements also change. Old ways of doing things are transformed as the technology creates new opportunities (Stewart, 2003). New ways of doing things emerge and can have implications on social relationships and power structures.

Early studies of domestication focused on integration of communication technologies into the home (Silverston et al., 1992; Silverstone, 1994; Haddon & Silverstone, 1995; Aune, 1996). One well-cited example is that of Silverston et al. (1992), who first coined the term domestication to describe the “taming of the wild” facts and artefacts. Taming in this context refers to the integration of outside technologies into what the authors call the “moral economy” of the household. This term is used to describe a space in which objects and meanings define a particular semantic universe. The authors emphasize that each moral economy is unique. As a result, processes of domestication will occur differently across households. Later work has extended this narrow focus to examine the domestication of ICTs outside of the household space (Williams, Stewart et al. 2005). This includes the internet in Irish and Dutch classrooms (Hynes & Romes, 2006), Norwegian universities, (Levold, 2001 ) and Scottish internet cafes (Laegran & Stewart, 2003). It also includes the mobile phone in Korean classrooms (Lim, 2008), on Russian streets (Lonkila & Gladarev, 2008) and in the workshops of mobile phone repairers in Burkina Faso (Hahn & Kibora, 2008).

All of these studies emphasized the contextual contingency of the domestication process. They also identified a variety of factors that shape processes of meaning construction and practice formation. This includes infrastructure, power relations, regulatory regimes, and gender roles (Williams et al., 2005). It must be made clear, however, that the majority of the domestication work has been conducted in Northern countries. This is with the exception of the Burkina Faso study noted above, which identified a variety of interesting factors that shaped usage patterns. This includes traditions of orality and the heirarchisation of speech. Because of this narrow focus, it can be argued that the explanatory power of this theoretical approach is limited. There are several factors particular to resource poor communities that have not been identified within this body of literature. One of the goals of this research is to extend this narrow focus and highlight the numerous factors—from tribal affiliations to structures of urban-rural dependencies—that shape domestication in the South.

The domestication scholarship also puts emphasis on the meanings attached to the technological artifact but not the associated practices. Such an omission is unfortunate because, as will be described below, technological practices are a vital expression of social

hierarchies and relations. Thus, any study of domestication should take technological practices as their starting point and recognize that these too are laden with meanings. It should further situate these practices within others in the community. This will make it easier to understand why technological practices exist in the first place, and how their evolution and displacement engenders social outcomes.

### ***4.3 Focusing on practices: The anthropology of technology and practice theory***

Like the domestication theorists, scholars within the discipline of anthropology of technology recognize the co-constructive processes that shape technological development. However, the relationship between the user and technology is conceptualized a bit differently. That is mainly because practices, rather than the technological artefact, are made central to the analysis. The general starting point for many of these studies is that technological practices are embedded in, and derived from, larger symbolic systems. Such systems produce (and reproduce) these practices in order to generate meaning. The literature also emphasizes that technological practices are almost entirely reducible to other social strategies. This is why they should not be conceived of as corresponding to any logic of material efficiency or progress (Lemonnier, 1993). Some authors even go as far as suggesting that the word “technical” should not be used to describe these practices (Lemonnier, 1993).

There are several examples in the literature discussing the social factors shaping technological practices. One good example is Mahias (1993) who examined pottery making techniques in India. The author noted a significant variation across sub-castes and explained that such variation had social significance. It was central to processes of differentiation as well as caste identity. In fact, any divergence from the caste specific practices was considered a disruption of the social order and a threat to the entire group. The author further explained that technical variation could be translated clearly in terms of status or rank as a hierarchy of potters existed in each region. To maintain this hierarchy, many potters fiercely restricted their specialized skills to their groups. They even avoided teaching such skills to their daughters, who could be married into other clans. By doing this, they were protecting their caste identity and maintaining their position within the social order.

Another study of chemical weedkillers in the wine region of Southern France further illustrated that practices had meaning within the social organisation (Guille-Escuret, 1993). These weedkillers provided farmers with a more efficient means to get rid of unsightly

weeds. They were far less labour intensive than plowing, which had to be conducted several times throughout the spring and winter. However, despite the benefits offered by this new technology the farmers still reverted to older methods of plowing. This was because the entire social hierarchy revolved around this practice, with the plowmen at the top and the brassiers who pruned the vines occupying a subordinate position. The dislocation of the plowing practice would also mean the reorganization of the entire structure. Such a reorganization was not advantageous for the plowmen who held a ideological superiority within the community. These two examples confirm the point made above—that technological practices are implicated in social strategies.

The literature also extends its analytical scope. It identifies social practices that impact technological development, which are not related to the technological artefact but exist in the same environment. For example, a study of household appliances in a South African informal settlement noted a complete absence of labour saving cleaning devices such as washing machines (Meintjes, 2001). Because of this absence women spent many hours labouring over soapy tubs, and toiling on their knees to wash the floors. The author explained that these labour intensive cleaning practices were associated with gender specific roles and had social significance. A “proper woman” was expected to work hard around the home to keep the contents, as well as its members, clean. She would make her propriety evident by engaging in these tedious practices. Those who chose the less intensive washing practices were described as “lazy” by some community members. Because of these meanings, many women chose to reject the washing machine and other cleaning devices.

The literature also makes some compelling arguments as to why technologies are accepted. For example, Pfaffenberger (1992) explains that acceptance is more likely if the technological features fit into the already existing social practices and systems of logic. He uses the Maori appropriation of European iron artefacts to illustrate this point. He notes that the Maori only began to see value in the foreign tools when use practices were integrated into indigineous systems of agriculture and conformed to local ideas of appropriateness. The frame of reference for Maori adaptation of the iron tools remained their traditional folkviews and rules and not European systems of logic (Schaniel, 1988).

Lauriston Sharpe (1952) also illustrates this point in his analysis of the seemingly “insignificant” steel axe amongst the Yir Yorant. He explains that the technology was initially accepted because it made it fit into existing practices and made life a little easier. Firewood could be cut more quickly, and houses constructed with greater ease. This allowed the aboriginals to spend more time on an art they had mastered thoroughly. This, according



to Sharp, was the art of sleep. Sharpe further explains that a variety of unintended consequences emerged after the steel axe replaced its stone predecessor—kinship structures were weakened, gender relations challenged, and the very meaning of life itself threatened. How could such an “insignificant” steel axe engender these consequences? Sharp made clear that a variety of practices centred around the stone axe. These were embedded in, and conditioned by, the social system. By system, he meant the totality of social relations, economic arrangements, political processes, cultural categories, norms, and values that exist in a community. When the steel axe was introduced, the practices associated with the stone axe were displaced. The result was cultural degradation. The system, which conditioned the stone axe practices, was forever altered by their displacement.

Numerous other studies have also showed how changing technological practices engendered social change. For example, Aporta and Higgs (2005) examined the adoption of GPS technology by Inuit hunters in Northern Canada. They found that these technologies displaced traditional practices of way-finding, which relied on knowledge of the local landscape and the patterns of nature. This caused tension between hunters of different age groups. The elders worried that an over-reliance of GPS would result in the loss of ancestral knowledge and skills. To avoid this from happening, the younger hunters began to use the technology in creative ways. For example, they would employ GPS on foggy days when they were unable to discern their position on the land. Through such usage, they were able to preserve their traditional navigation techniques. This example is interesting because it shows that technologies do not always displace existing practices. In some cases, they are integrated into the activity base to ensure the preservation of local knowledge and values. This also confirms that technological practices are also social in nature. As a result, they do not always correspond to a logic of material efficiency or progress.

Thus far, two important points have been presented. The first is that technological practices are shaped by social factors. The second is that these practices also shape society. In other words, they impinge on the elements that give meaning to daily life. Numerous other authors have noted the vital relationship between technological practices and the social system. The general premise is that the social system guides and even dictates these practices. The authors further note that the opposite is also true. Practices also shape the system. This is why the introduction of a new technology, and the emergence of its associated practices, can radically alter the social fabric. It is also why some technologies are rejected. Resistance is often embedded in strategies of cultural reproduction. Although these studies provide several examples illustrating this relationship, many fail to explain how technological practices and

the social system are co-constructed. For such an explanation, attention will be turned to Bourdieu.

#### **4.31 Bourdieu's analysis of practices**

For Bourdieu (1977; 1989; 1994; 2000), social composition can only be understood through an analysis of practices. Such practices function not only to structure daily life but also to define the roles of individuals within society. Thus, conforming to one's duty a "man" or "woman" can only be made visible through practice. Often, these are orchestrated through time, and each practice is given its appropriate rhythm. For example, Bourdieu explains that many cultures expect a "worthy man who is conscious of his responsibilities" to get up early and engage in work activities (Bourdieu 1994). A man who gets up too late is seen as lazy. One who gets up too early is over ambitious. The following excerpt is based on Bourdieu's observations in Northern Algeria:

A man must walk with 'measured pace', neither lagging behind or running like a 'dancer', a shallow, frivolous way to behave, unworthy of a man of honour. So there is mockery, too, for the man who hurries without thinking....who works so hastily that he is likely to 'maltreat the earth'(Bourdieu, 1994, pp. 158).

Bourdieu emphasizes that any diversion from these culturally defined and temporally orchestrated practices is often considered suspicious or deviant behaviour. Thus, a vital part of social life is not only knowing the rules of the game but also understanding when it can be played. Through such understanding, Bourdieu explains, social actors contribute to the maintenance and reproduction of the social order.

But, how do people know how or when to act? Bourdieu has introduced the concept of habitus to answer this question. This concept is used to describe a set of internalized structures that shape and govern practice. Such structures emerge out of the objective structures of the social environment. They also function to sustain these objective structures through their generativity. It must be noted that the habitus is not always transmitted with conscious intention. These internalized structures often exist in the realm of implicit and unstated beliefs; people do not always know why they act. "It goes without saying because it comes without saying", Bourdieu explains (1977). The habitus reveals itself not only in words but also in the orchestrated rhythms of society and the individual actions of its members. Bourdieu uses the term *body hexis* to explain this performative aspect of habitus. This includes socially inculcated moves, gestures, postures etc. It also includes "dispositions", or inclinations towards certain responses and actions over others as well as

the tendency to engage in certain practices over others. Bourdieu further notes another important function of the habitus. It operates as a world view and provides a framework for moral judgements, ethical commitments, and aesthetic inclinations (Chopra, 2003).

The concept of field is also used in Bourdieu's work to explain the social setting in which the habitus operates. These fields are structured spaces of action and sites for the accumulation, production, circulation and appropriation of goods, knowledge, and status. They are characterized by struggles, which are carried out over various types of resources: economic (material wealth), cultural (person's possession of recognized knowledge), symbolic (status of honour or prestige) and social (social ties and network). By engaging in these struggles, actors can accumulate a greater amount of resources. This improves their position, relative to the other actors, in the field. However, because of the scarcity of resources, accumulation is often a zero-sum game. That is, someone has to lose out on resources for another to gain.

Bourdieu characterizes these field struggles in several ways. Strategies of conservation are pursued by those who hold dominant positions in the field; those of subversion are pursued by actors who want to challenge the place of the dominant group and to increase their resource base. He also makes clear that during these struggles, actors will actively convert and re-convert their resources to maintain or improve their position in the field. For example, he shows how economic capital is frequently converted into the symbolic and uses Malinowski's concept of chief as "tribal banker" to make his case (Bourdieu, 1977). Bourdieu explains that the chief amasses food only to lavish it on others. By doing so, the chief builds up capital of obligation and debt. These are repaid in terms of respect, homage, loyalty, work and services. Bourdieu further defined symbolic capital as being "denied capital". That is, the result of symbolic practices that downplayed the economic dimension of exchanges and disguised them as disinterested. Such misrecognition conceals the power struggles that occur over economic resources.

Social capital can also be converted into, or functions as a multiplier of, the economic. The degree of ease with which this conversion is made depends on the size of the network of connections that can be effectively mobilized. It also depends on the amount of economic capital that exists within that network. In the case of Kibera and Bukura economic capital was scarce, which made it particularly valuable. Such scarcity resulted in struggles of both conservation and subversion. Urban migrants would engage in struggles of conservation to maintain their dominant position within the multi-spatial household. Their rural relations would engage in ones of subversion to increase their economic capital and to have more

autonomy. This chapter will reveal several examples of such struggles that occurred in the field. Chapter 5 will continue this discussion.

Bourdieu also discusses impact, which he explains as the failed reproduction of practices. Such failure occurs when actors begin to pursue their own strategies of action within the sets of constraints and opportunities available to them (Dirks, Eley et al. 1994). This engenders changes to the social structure in general, and internalized habitus in particular. That is, new ways of thinking, perceiving, and acting take habitual form. At the extreme end, changing practices may challenge the entire validity and stability of the entire social structure.

How does technology fit into all of this? All technologies, from the most basic forks to the most advanced automobiles, are deeply tied to practices. If practices are governed by internalized structures, as Bourdieu suggests, then it can be argued that technological action is also social in nature. It must be noted that the technologies also shape action. Artefacts embody particular dispositions and tendencies in their design. However, these dispositions and tendencies are only realized when practices are enacted in particular ways. Technological practices are especially important in the context of field struggles. They can facilitate the accumulation of capital and help users improve their positions in the community. This will be discussed in more detail in the next chapter.

The ideas presented above will be used to frame the empirical findings. The next section will begin by introducing the users in both research sites and explaining technological practices. The discussion will make clear why these practices emerged and how they displaced others in the community. Attention will also be paid to the internalized structures, or habitus, that governed action and the hierarchies that shaped interaction in the field. This will set the context for the next chapter, which will explain how these practices changed through time. It will also prepare the reader for Chapter 6, which explains how changing practices engendered social outcomes.

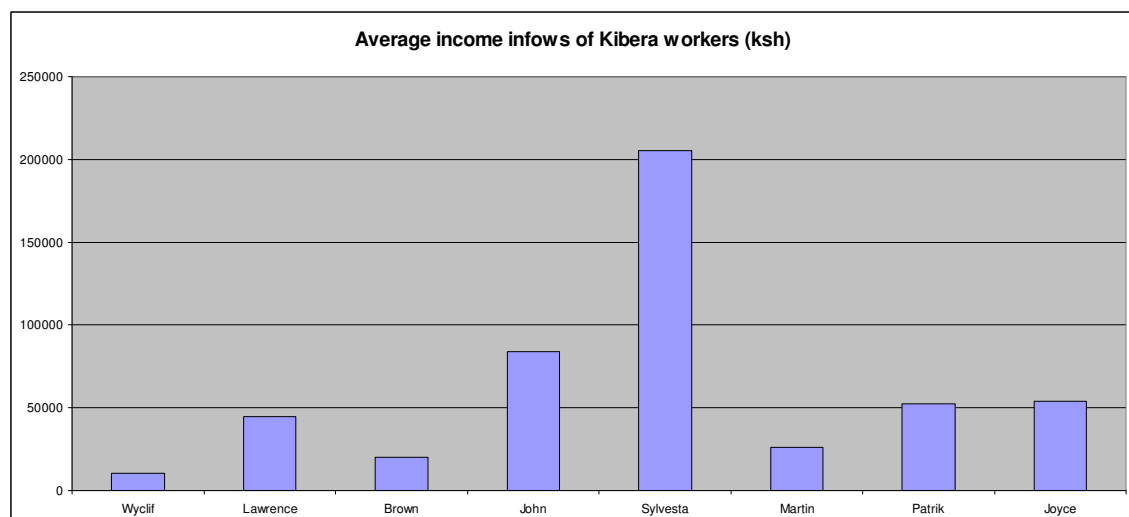
#### ***4.4 Introducing the users***

Two classes of users were identified during the fieldwork; the urban migrants in Kibera and the rural recipients in Bukura. These users were enrolled in the socio-technical system at different times. They also exhibited different usage patterns. Those in the former category were what the diffusion theorists have termed the “early adopters” or “early majority” (Rogers, 1995; 2002; Kautz & Larsen, 2000). They were younger, more educated and wealthier than their rural counterparts. They started using M-PESA at an earlier stage of diffusion, usually within the first six months of launch. Those in the latter category were the

“late majority” or “technology laggards”. They tended to be older, and have lower income and education levels. Many adopted M-PESA because they were persuaded to do so by their urban contacts. This usually occurred after M-PESA had been in the market for one year. It must be noted that these categories of users were not homogenous. There was a variation in user characteristics and usage patterns. These will be made clear in this section.

#### **4.41 The urban migrants**

The first category of users was the urban migrants who came to Kibera from their natal villages to find work. As is shown in Table 9, the majority of these migrants were male. As will be described below, because of division of labour within the household it was more common for men to migrate to the cities in search of employment. It was also more common for men to support their families back in their rural homes. Most migrants were employed in the informal sector. As was made clear in Chapter 2, they worked as welders, carpenters, tailors, or hawkers within Kibera. Some also found jobs in the city centre or sprawling suburbs of Nairobi. They worked as security guards, gardeners or house-help in the homes of rich Kenyans or ex-patriots. Most urban users engaged in several income generating activities. For example, they would spend their nights working as security guards and their days as shop-keepers. As a result, there was a significant amount of diversity in the income inflows. This was made evident in the financial diaries, which revealed total income inflows that ranged between 10,000 Ksh and 200,000 Ksh. It must be made clear that these inflows were not just constituted by wage but included all the cash that came into the hands of the migrants during the monthly period. Thus, money from the sale of a good, a gift received and even a bank withdrawal also constituted income inflows.



**Figure 16: Income Inflows for Urban Diary Participants**

Name	Job	Relation to Diary Participant
Wyclif	Barber	Married to Eunice
Lawrence	Painter	
Brown	Security guard	Married to Betty
John	Security guard and shop owner	
Sylvesta	Security guard and shop owner	Married to Elizabeth
Martin	Shoe repair	Married to Margaret
Joyce	Shop owner	
Patrik	Pastor	

**Table 9: Urban Financial Diaries Participants**

Figure 16 illustrates that there was a significant amount of variation in the income inflows. Such variation was related to the type of job that was held by the informant. For example, John and Sylvesta had much higher income inflows than the other participants. A large segment of these inflows came from the proceeds of their shop. They were also constituted by debts repaid. In some cases, these debts were the result of credit given on goods in the shop. The men would also lend out cash to family, friends and neighbours. Usually, no interest was received on these personal loans. The informants also noted that there was a variation of income inflows from month to month. They explained that this occurred because informal sector work was unpredictable. Some of this unpredictability was caused by exogenous factors such as political instability. During the post election violence many of the informal sector workers were forced to close their shops because of security risks. Business was also slow in the months that followed because of rising inflation. As was made clear in Chapter 2, inflation rates were over 20%.

Most urban users had completed primary education and over half had completed secondary school. About 5-10% had also gone on to university. Most individuals within this latter segment were formally employed and worked as lawyers or administrators in the numerous government offices in central Nairobi. They often resided in the richer segments of Kibera, such as Kianda or Olympic. About 1/3 of the users in Kibera had an account with a formal financial institution. The most popular were banks and MFIs. A large segment of the informants claimed to have this account because their salaries were paid directly. Others kept

their savings in an account because it allowed them to take money out of the home and diversify their savings base. This will be discussed in more detail in the next chapter. Many informants explained that accessibility was a major barrier to saving with banks. As was mentioned in previous chapters, there were no formal financial institutions within Kibera. Banked M-PESA users thus had to travel outside the informal settlement to access services. This was inconvenient for those who conducted most of their business within Kibera.

Most urban users had a mobile phone for at least two years. Usually, they purchased the handset from dealers in Kibera, or in the commercial business district (CBD). Some also purchased the phone from friends and relatives in the informal settlement. Because many of the urban users did not have electricity in their homes they would visit small shops that offered battery charging services. There were several of these shops located around Kibera. Many of the urban users had more than one SIM card, Safaricom and Zain being the most popular. This allowed them to take advantage of the various promotions offered across the network. Most urban users were familiar with the basic functioning of the technology and knew how to send text messages, and maintain their contact lists on their phone book. Voice calls were also frequent in Kibera. In fact, it has been suggested the informal settlement is one of the biggest customers for airtime in Kenya (Querengesser, 2009). This suggestion is likely to be accurate given the high population density and the significant amount of informal sector activity that takes place within Kibera. Urban users also exploited other features of the mobile handset. Many played games or took pictures with their phones. They also used the device to check email and access social networking sites such as facebook. This was especially the case during latter stages of the fieldwork when facebook became more popular.

Many had heard about M-PESA on the radio, or seen it advertised on the numerous billboards around Nairobi. As was explained in Chapter 2, Safaricom launched an extensive marketing campaign when introducing the application. They had also heard about M-PESA from friends or relatives, who had some previous experience with the application. These contacts often accompanied the urban users to the store to register. They also helped them to make the first transfer. The urban users further noted that after becoming familiar with the application they also encouraged others to register, not only in Kibera but also in their natal village. From this finding it can be argued that users were not just elements in the M-PESA system but also vital system builders. They informed others about the application, and provided support during the early stages of adoption.

When asked why they adopted the application, most urban users said it was because of cost. For example, to send 1000 Ksh from Kibera to Bukura cost 30 Ksh (£.24). This is 27 percent cheaper than the post office's PostaPay(US £.32), and 68 percent cheaper than sending it via a bus company (£.70). Urban users also preferred M-PESA because it was faster and safer. The transfer occurred almost instantaneously as money did not have to physically travel to the destination. This also decreased the risk of it being lost or stolen along the way. M-PESA was also easier to access than the other transfer services. Almost immediately after it was introduced, agents began to open around Kibera. There were over ten of these agents by the end of 2007. The number went down after the post-election violence but rose again after there was stability. When the author left the field in December of 2008, there were over forty of these agents scattered around Kibera. The presence of agents made it much easier for the urban users to send money. They did not have to leave the informal settlement to deposit or withdraw cash. The transfer could also be made from anywhere, and at anytime, as long as a balance was kept in the account. This confirms one of the findings of the FSD survey discussed in Chapter 3. That is, M-PESA acted as a substitute rather than a complement to the other money transfer channels.

#### ***4.42 Urban usage patterns***

Most urban migrants adopted M-PESA to “send money back home”. When asked to whom the money was being sent, the majority of informants asserted that they were sending money to family members. Men often claimed that the recipient of the transfer was their wife, or wives in the rural area. Women usually sent money to their mother. The informants were also asked why they were sending money back to the rural area. The majority claimed that they had to “maintain” their families; that is, to ensure that they had enough money to purchase food and other necessities. Some informants also sent money to make “improvements” to their farm. For example, Martin, who had married a second wife, made frequent transfers back home to build a new hut. Sylvesta was sending money to build a chicken pen.

In regards to frequency, the majority of informants said that they would send money back “regularly”. When asked what “regularly” meant, different answers were given. Most informants asserted that money was sent once per month, at month-end. Some said that they would only send money back home when they were requested to do so by their relatives. They explained that this would happen when the relatives were experiencing financial difficulties and could not “cope” without assistance. It must be noted that the frequency of transfers was often associated with the nature of the relationship between the sender and



recipient. For example, transfers were more frequent and regular between close kin (spouses, children, siblings) than distant kin (aunts, uncles, cousins). Distant kin transfers were also more frequent than non-kin (friends, colleagues). The majority of these latter non-kin transfers occurred between “village connections”. For example, many of the younger informants said that they used M-PESA to transfer small amounts of money to friends from the village that lived in Kibera. They said that it was their “duty” to send “a few hundred bob” to a friend in need.

Not all informants were sending money back to “maintain” their families. Some claimed to have commercial and political interests in the village. One man said that he owned a construction company with his sister in a small village close to Kisii. He came to Nairobi occasionally to make “extra money”. Every Sunday he would send this extra money back to his sister who would then invest it in the business. Another man asserted that he regularly used M-PESA for “political reasons”. He said that he was the chief campaigner for his political party in his rural district and would often transfer large sums of money from Nairobi to other members of the party. When the money was received, it was used to fund their political campaigns. Some informants also used M-PESA to top-up their mobile phones. This practice was especially common at night. Many of the informants did not want to leave their homes because of the various security risks.

M-PESA was also used for business purposes by the informal sector workers. For example, a dress maker in Kibera explained that she used M-PESA to pay her suppliers, who were scattered all over the country. An owner of a *matatu* (shared taxi) fleet said that he used the application to collect cash from each of his drivers. During rush periods he had 15 of these drivers scattered around Nairobi. He did not want them to carry larger amounts of cash as robberies were common. Every couple of hours the drivers would stop at an M-PESA agent to deposit and send off their proceeds. Numerous informal sector workers also used the application to disburse, or collect salaries. One informant, who owned several small kiosks around Kibera, explained that M-PESA saved him a lot of time. He no longer had to walk to each of the kiosks to pay his workers. He also had a record of the transfer on his phone, which made it easier to “keep track” of his payments.

Some of the informal sector workers in Kibera also used M-PESA to receive payments from customers. However, these payments were usually of greater value. As was explained by Sylvesta:

It does not make sense for my clients to pay for something small with M-PESA...then they get charged 25 bob just to make a small payment. When you are buying something for 100 bob it is just too much...But I have guys who buy on credit. Sometimes they owe 5000 or 6000 bob. Then it makes sense [to pay with M-PESA]...Then it is less expensive.

As was described in Chapter 3, the fee structure was designed for money transfers and not payments. Many of the urban users explained that it was “too expensive” for transactions that were of smaller value. The urban informants made clear that M-PESA was only used for smaller value payments when the buyer did not have cash. They further explained that cash was still the preferred method of payment. It guaranteed face-to-face contact, which was a vital part of the exchange. Martin explained that such contact allowed him to maintain “good relations” with his clients. He further explained that this made it easier to “negotiate” future deals.

Despite these other usages, it must be noted that M-PESA was mainly used by the urban migrants for the transfer of remittances. This finding makes clear that users were initially enacting the technological script as intended by the designers. Chapter 3 explained that M-PESA was developed to facilitate money flows from urban to rural areas. However, as will be made clear in the next chapter, usage patterns began to change as users became more familiar with the application. Many began to use the application for savings. Initially, they would leave a small amount in their accounts before making a withdrawal. Eventually, they began to accumulate their cash by making frequent deposits of “small money” into their M-PESA accounts. This particular use case is interesting because M-PESA was never designed as a savings mechanism. This shows that the technological script was also enacted in unintended ways.

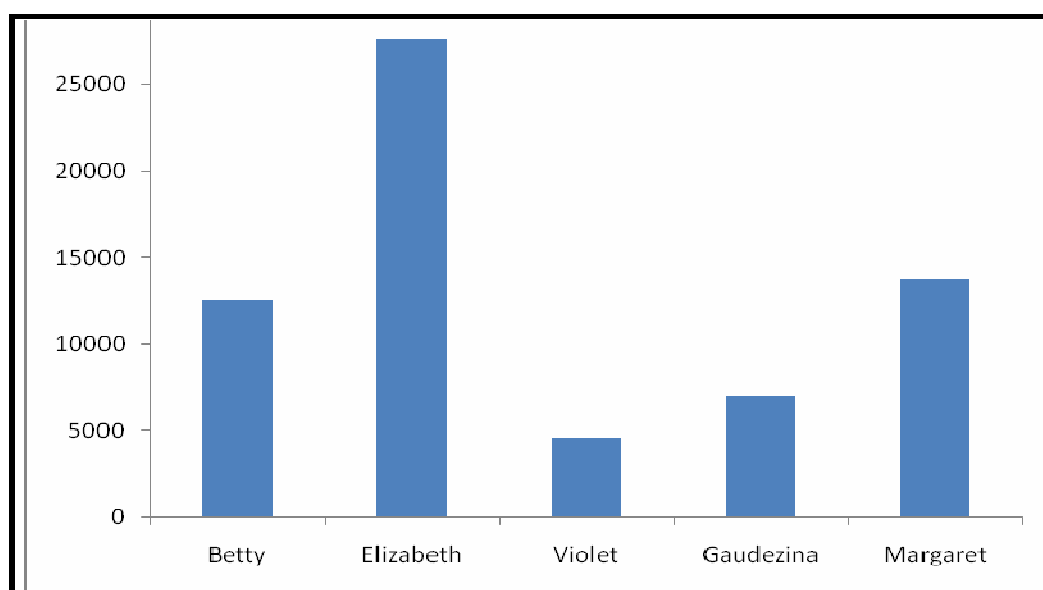
#### ***4.43 The rural recipient***

The second class of users were the rural dwellers who resided in Bukura and surrounding villages. As is shown in Table 10, the majority of these users were subsistence farmers and lived off of their land. A very small segment of these farmers were formally employed. Usually they worked as teachers in the local school or as wage labourers in nearby towns. As the graph below indicates, the income inflows in Bukura were significantly lower than those in Kibera. A large portion of these inflows was derived from remittances. The financial diaries revealed that such remittances, on average, constituted 38% of household income. In some cases, this number was much higher. Numerous informants revealed that 70% or more of their income came from urban contacts. Rural dwellers also engaged in various income

generating activities. For example, many would sell goods from the farm to neighbours. This includes high yielding food crops such as maize and beans, cash crops such as sunflower and sugar, and animal products such as eggs and milk. During the planting and harvesting season many would also work on the farms of their neighbours in return for a daily fee and a meal.

Name	Job	Relation to Diary Participant
Betty	Sold goods from farm, worked on farms of others, fetched water	Married to Brown
Violet	Not working	Betty's friend
Gaudezina	Sold goods from farm	Betty's Mother
Elizabeth	Sold goods on market-table cloth etc.	Married to Sylvesta
Margaret	Sells goods from farm	Married to Martin

**Table 10: Rural Financial Diaries Participants**



**Figure 17: Income Inflows for Rural Diary Participants**

Figure 17 shows significant variation for income inflows. The diaries revealed that the women with higher incomes were usually less reliant on remittances for the livelihoods. They would engage in a variety of wage earning activities, which allowed them to diversify their income base. For example, Elizabeth would sell goods from her farm. She also operated a small business and made table cloths for sale on the local market. Betty derived her income

from selling farm goods. She also worked on the farms of her neighbours and would occasionally be paid to fetch water. Violet had the lowest income inflows amongst the rural participants. She was heavily dependent on remittances for her livelihood as her husband did not want her to work. He also did not want her to “profit” by selling goods from the farm.

The majority of the rural users were female, or retirees. They tended to be less educated than their urban counterparts. Although most had completed primary school only about 1 in 5 had completed high school. An even smaller segment had gone on to complete university. This latter segment was usually employed in the government offices in neighbouring Kakamega. Some also worked at a nearby agricultural college. The majority of the rural users were also unbanked. As was mentioned in Chapter 2, there were no formal financial institutions in Bukura. Residents had to travel to Kakamega to access these services. Many also explained that the formal financial institutions were too expensive for their “small savings”. They instead chose to invest their left over cash or save their money informally. This will also be discussed in greater detail in the next chapter.

Mobile phone penetration rates were lower in Bukura than Kibera. About 1/3 of the residents of Bukura had their own phone. The majority had received their phones from urban contacts. The length of ownership of mobile phones tended to be lower in Bukura. Most rural users had mobile phones for less than two years. These low penetration rates led to handset sharing, which has also been observed in other contexts (Konkka, 2003; James & Versteeg, 2007). Most often, such sharing occurred between relatives, neighbours and friends in the village. In some cases, the borrower had their own SIM card, which they would use to make the call. If they did not have their own SIM, or were out of credit, they would “flash” or send a missed call to the recipient who would then call back. It must be noted that mobile phone ownership had an impact on M-PESA adoption and usage. Some registered users did not have their own mobile handset. They would borrow a handset when money was sent. Those who did not have their own SIM card would usually receive money via their friends and neighbours. In some cases, unregistered users would also have money sent directly to the phone of the agent. Because such practices occurred, it can be argued that the official figures do not adequately reflect the number of M-PESA users.

Usage of the mobile phone in Bukura tended to be more limited than in Kibera. Some would use their mobiles only to receive calls and were not aware of the basic functions of the handset. They had trouble sending text messages, did not know how to maintain the contacts in their phone book, and were not aware that they could access the internet via their mobile

phones. The lower levels of education had an impact on mobile phone usage patterns. In particular, many of the elderly informants could not send SMS messages because they were illiterate. Their usage of the mobile phone was thus limited to voice calls. Conversely, many of the younger M-PESA users were comfortable with their hand sets. Like the urban migrants, they would exploit the various features of the technology and make frequent calls, send text messages and even access the internet. As will be made clear in the next chapter, these younger users were vital system builders in their communities.

Most of the rural recipients found out about M-PESA from their urban relatives. As was also explained in Chapter 3, the M-PESA pricing scheme was designed so that it is cheaper for the sender to transfer money to a registered user. Because of the price difference in transaction fees for transfers between registered and non-registered users, many of the senders persuaded the rural recipients to also adopt the application. They often made the decision on the money transfer channel because they were sending the cash. In some cases, the rural recipients adopted M-PESA before their urban contacts. One informant explained that she had persuaded her husband to use M-PESA after the shop had opened in Bukura. With the previous method of money transfer she had to travel into Kakamega, which was nearly 20 km away. Often such a trip was expensive; a return journey would often cost 200 Ksh or more. With M-PESA, she could just walk to the village centre to retrieve her cash. Such a trip, she explained, was free. Like their urban counterparts, many rural users claimed that they preferred M-PESA to the other money transfer options. When asked why, most asserted it was because of accessibility. Money could be retrieved from within Bukura. It was also sent to the recipient “direct”. This decreased the chance of money being lost or stolen along the way.

#### ***4.44 Rural usage patterns***

The rural dwellers signed-up with M-PESA to receive money from urban contacts. During the early stages of adoption, most would receive money at end-month. However, as will be shown in the next chapter, the frequency of these transfers increased through time. As was the case in the urban areas, the majority of transfers occurred between kin. For example, most of the women explained that they received transfers from their husbands. Many of the older M-PESA users also received money from their children or grandchildren. Transfers between non-kin relations were also observed. Some return migrants continued to have business interests in the city and would receive transfers regularly. For example, one informant had purchased a plot of land just outside of Kibera. He was renting out this land to

a friend, who would use M-PESA to transfer his rent payments. It was also not uncommon for these urban migrants to receive cash from past colleagues and friends. Usually, these transfers functioned as income support for the migrants.

Some rural users also sent money with M-PESA. In particular, those who had children schooling outside of the village would send them money for fees and up-keep. Some of the rural women would also transfer money to their mothers. This was especially the case if their mothers lived in distant villages that could not be easily accessed by foot or *boda boda* (bicycle taxi). The women who lived in close proximity to their mothers would usually make the transfer by hand. Rural users also made transfers to their urban relatives. Sometimes this occurred because there was an “emergency” in the city. For example, one elderly farmer explained that his son had recently been injured in an accident at work. He used M-PESA to send money for hospital fees. He also sent him small amounts for his “up keep” until he recovered. Money was also sent for funeral expenses. When a person from the village died in the city, the body was usually transported back to the rural home for burial. To help meet the costs of the transfer, friends and relatives in both the urban and rural areas would contribute money via M-PESA. Rural users would also send money to urban migrants who were having financial troubles in the city. This occurred after the migrant first arrived and was looking for work. It also occurred when a migrant lost their job. The money received functioned as basic income support. In some cases it was used to purchase a ticket back home.

M-PESA was also used for business purposes. However, not to the extent that it was in Kibera. As mentioned previously, there was less economic activity and money flows within the rural areas. Some of the rural women, who worked sold their goods at markets around Western Kenya, explained that they used the application to “keep their money safe” while travelling. They would deposit their proceeds after finishing their work day. They would then retrieve the money after returning to Bukura. The farmers who grew cash crops often used M-PESA to receive their proceeds from the buyers. They explained that they preferred this method to the bank because they did not need to travel into Kakamega to access their cash.

As was the case with the mobile phone, M-PESA usage was more limited in Bukura. Most rural users only received money with M-PESA. They did not top-up their mobile phones or send money. In some cases, the rural dwellers were not aware that M-PESA could be used for other purposes. This was mainly because Safaricom did not advertise the other features of

the application as the marketing campaign was focused on the “send money home” value proposition. The inability for some rural dwellers to use a handset also proved a significant barrier to adoption. Those who only used their mobile phones for voice calls found it difficult to navigate through the M-PESA menu. This confirms the argument made in Chapter 3 that mobile phone usage patterns are a vital element of the socio-technical system. Language was also an issue. M-PESA is offered in two languages—English and Kiswahili. In Bukura, some residents only spoke the local dialect of Kiluhya and did not understand the options on the M-PESA menu. Because of these various issues, agents became vital system builders at early stages of adoption. They would often conduct the transactions on behalf of the rural users. This will be discussed in more detail in the next chapter.

There were also other barriers to usage in Bukura. In particular, cash float shortages at the agent locations also made it difficult to access cash. As was explained in the previous chapter, the M-PESA system is dependent upon banks. For withdrawals to be processed, agents must maintain their cash float. Most often, they do this by making regular trips to the bank. This is problematic for the rural agents as most banks are located in urban areas. Because of the distance, and cost of travel, some agents did not make frequent trips into town to top-up the float. Instead, they gave out cash only when other customers made deposits. This constrained the efficiency of M-PESA. It also forced some customers to travel into town to access the service.

#### ***4.5 Explaining the usage patterns***

But why do these usage patterns exist? Why was M-PESA adopted for money transfers in Kibera and Bukura? Earlier in the chapter an interesting point was made in regards to the acceptance of a technology. According to Pfaffenberger (1992), technologies are more likely to be adopted if technological features fit into already existing social practices and systems of logic. This argument can be used to explain the success of M-PESA within the two communities. The application grew rapidly because it facilitated remittance practices. There is plenty of evidence to suggest that such practices were pervasive in Kenya long before M-PESA was introduced (Ross & Weisner, 1977; Geschiere & Gugler, 1998; Owuor, 2005; Owuor, 2006). For example, a study conducted in Western Kenya found that 86.8% of urban migrants had transferred money back to their natal homes at least once in the previous year (Hoddinott, 1994). One conducted in Nakuru town found that 35% of urban respondents sent money back every month, while 41% sent money back every two to four months. The literature also makes clear that the remittances are multi-directional. Oucho (1996) found that 73% of all remittances are urban-to-rural while 26.7% are rural-to-urban. These transfers

are made in both cash and kind. Urban migrants send “city items”, such as furniture, wall clocks, and radios back to the village. Rural dwellers send food from the farm to their urban relatives.

Several events in Kenya’s history gave rise to the remittance economy. The first was the introduction of the Kenyan shilling, which occurred not long after the establishment of colonial rule (Mwangi, 2001; Ryan, 2007).<sup>14</sup> The second was the introduction of taxation policies, which led many to adopt this new form of currency (Matsuda, 1998). In Bukura, such taxes were imposed on huts and at first payable in kind (timber, hoes, compulsory service). Gradually, the rural dwellers were forced to pay in cash. This was one of the main push factors for the Luhya men to migrate to urban areas in search of work (Matsuda, 1998). The emergence of a migrant labour system also gave rise to the remittance economy. The colonial government took several measures to drive migrants into urban areas. The aforementioned taxation policy is one example. They also implemented policies that prevented the migrants from permanently establishing themselves in the city (Elkins 2005). For example, labour was recruited on temporary contracts, and wages were kept low. Only single accommodation was provided to the workers, which discouraged the settlement of families in urban areas. Such policies also stimulated circular migration patterns. It was common for the migrant workers to oscillate between the urban and rural area throughout their working lives.

These circular migration patterns still exist today (Gugler, 1989; Bigsten, 1996; Owuor, 2004; Owuor, 2006). This is mainly because of the disparities between urban centres and rural areas. As was described in Chapter 2, there are few opportunities for formal employment outside of the cities. Wages also tend to be significantly lower in the rural areas, due to the lack of union representation and collective bargaining agreements. Because of such disparities, many living in places like Bukura migrate to the city in search of work. Such a move, however, is not permanent. Most migrants return to the village when they lose their jobs or are ready to retire (Hoddinott, 1989; Hoddinott, 1994; Oucho, 1996). According to Oucho (1996) 90.2% of migrants expect to return to their district of origin for retirement, while 76.5% expect to retire in their location (village) of origin. Precarious property rights instigate return migration. Kibera is situated in government land (Joireman & Sweet, 2008). This means that landlords own the structure that they rent out, but not the property on which it is situated. Because Kibera is the most profitable place to rent out property in Kenya, most

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<sup>14</sup> It must be noted that the colonial government went through several changes of currency before the shilling was standardized—from the Indian rupee to the East African rupee, then to the East African florin, and finally to the East African shilling (Mwangi 2001).



of these landlords are not willing to sell their structures. As a result, migrants spend their working lives as tenants.

Beliefs about death, and appropriate burial, also instigate return migration (Shipton, 1995a; Schwartz, 2000). There are no graveyards in Kibera. Informants explained that the city is not an appropriate place for burial because the soul can only be at rest in the village. They made clear that the soil of their natal homes contained a community of ancestral spirits. To be buried outside the home would result in a separation from this community. To ensure this did not happen, the bodies of the migrants were transported back to their rural home for burial if they died in the city. Community members in both urban and rural areas were expected to contribute to the transport cost. As was mentioned previously, many would make such contributions via M-PESA. Because of these migration patterns, many urbanites maintain strong relations with the village. Some even argue that these relations increase in strength as the migrant becomes more established in the city (Ross & Weisner, 1977). In the context of this research such ties are important to understand. They are vital determinants of remittance practices in general, and technological activity in particular. Stronger ties were usually reflected in more frequent remittance transfers (Gugler, 1971; 1975; 1989; 2002).

Aside from migration patterns, there are a variety of other reasons why these ties are maintained. One is related to local norms regarding the control and ownership of assets, such as land and cattle (Neitzert, 1994; Shipton, 1988). In the Luhya community, such resources are usually inherited and controlled by men. The rural home usually resides on ancestral land, which is passed down from father to son. Women get access to land through marriage but do not have ownership rights. Some migrants maintain contact with their rural relatives to ensure their future claim to such assets (Ross & Weisner, 1997).

These linkages are also maintained because of familial structures. As was described in Chapter 2, it is common for the wives and children to remain in the village as the men work in the city. Agesa (2004) has estimated that close to one-third of households in Kenya choose this type of living arrangement. In Kibera and Bukura this number is higher. At least half of the families are separated. Traditional gender roles are one reason for this separation. Luhya males are often associated with the marketplace and more likely to engage in labour-market activities. Women, on the other hand, are associated with the home. They are responsible for activities related to subsistence production on the farm, livestock care, family and household maintenance. Such a division of labour has facilitated the migration of males into urban areas and increased the instances of split family arrangements.

Finally, such relations are maintained because the village is a vital safety net for the migrant. Rural connections ease the transition to urban life and provide migrants with a source of economic security. During periods of unemployment, illness or political instability, the migrant often looks to the village for support. Migrants are also enmeshed in networks of home people whilst they reside in the city (Gugler, 2002). In Kibera, entire neighbourhoods are dominated by members of the same clan. Migrants often manipulate, and rely on these networks to find housing, secure employment and establish a business. Even religious life is based on village association. Many migrants choose a congregation based on communities of home people instead of attending a church in their own neighbourhood. Because of these connections, it is difficult for the migrant to escape the village even as they reside in the city.

These various social factors gave shape to remittance practices. They were also vital determinants of technological activity as M-PESA became the main channel for remittance flows. This confirms an argument from the anthropology of technology literature—that technological activity also helps individuals to meet their social goals. This is especially because M-PESA fit into existing social practices, rather than creating new ones. However, to fully grasp the importance of such activity within the social order, remittance transfers should not be studied in isolation. As will be shown below, the milieu of practices that exist in a field must be understood for the meaning of individual practices to be grasped.

#### ***4.6 Contextualizing remittance practices***

Parker Shipton (1992; 1995a; 2007) made several interesting arguments in regards to practices of borrowing and lending he called entrustment. Shipton explained that in Western Kenya just about anything was lent or entrusted; this included money, land, seeds, cattle, radios, labour, and even humans. Such entrustments pervaded the life of an individual. Debts of kinsmen were inherited at birth; obligations to the dead were repaid to kinsmen. These exchanges did not happen tit for tat. There was a structure of generalized reciprocity amongst community members. That is, debts were not strictly accounted for and economic favours could be repaid in other kinds. Shipton further explained that there was a cultural understanding of obligation. That is, people knew when and how to repay their debts and call in their dues. Such an understanding was shaped by local norms and structures of social organization.

This structure of entrustment can be affiliated to Bourdieu's concept of habitus. In this case, the milieu of practices that constituted entrustment were a manifestation of the habitus in action. The remittance transfers were one piece of a much broader network of practices that

shaped daily life by defining social roles and reinforcing hierarchies of power. They were also a representation of the struggles for material resources that occurred in the field. Because of the structure of generalized reciprocity, most urban migrants had accumulated capital of debt and obligation within their natal villages. The nature of the debt, and rules governing appropriate repayment, was contingent upon histories of interaction. It was also shaped by the nature of the relationship. That is, relationships between close kin were usually characterized by greater debt than those between distant kin; relationships between distant kin were also characterized by more debt than those between non-kin. Such structures of debt were reflected in remittance practices. As was mentioned above, transfers between close relations dominated; the ones between distant and non-kin were less frequent.

By accepting the money transfers, the rural recipients were also putting themselves in debt with the urban migrations. They reciprocated in various ways. After harvest, they would send maize and beans from the farm. They would also send money to the migrant when problems emerged in the city. This explains why remittance transfers were multi-directional. However, such reciprocation did not always happen in kind. As mentioned above, rural wives would maintain the land of their husbands whilst they were away; parents and siblings would also help by grazing cattle or working the farm land. The structure of generalized reciprocity was made especially evident during death. As was mentioned above, the entire community was expected to contribute to the cost of transporting the body back to the rural home. They also contributed to the funeral, either in cash or kind. These networks of debt often led to struggle within the field. As will be shown in the next chapter, many of the rural recipients would try to increase their income inflows by making demands for money from urban contacts. In reaction, the urbanites had to cultivate strategies to manage such requests.

By being enmeshed in the network of debts, and engaging in practices of reciprocation, those in the field were also accumulating symbolic resources. They were strengthening the network of their relationships and reinforcing their position within the social order. Both were important because they facilitated the accumulation of other types of resources, the material in particular. In the case of the urban migrants, such networks proved vitally important to their survival in the city. As was mentioned above, migrants often looked to their rural relatives for financial support. They would also return back home when losing their jobs. For the rural dwellers, these networks provided vital sources of livelihoods. Because of the limited amount of economic activity within the village, many had to depend on their urban contacts. This is why remittances constituted a large share of rural household income inflows.

The social capital base was also vitally important for the mobilization of economic resources. Those rural dwellers with extensive social networks could more easily secure cash. For example, a focus group of rural women were asked how someone could maintain their wealth in the village. They all agreed that having a network “city contacts” with jobs was vitally important. They also identified links to the “foreign” or other countries as vital. One woman had a brother living in America who would send her money home every month. This money became especially important when her husband lost his job and had to return to Bukura. The importance of social networks will be explained in more detail in the next chapter.

#### ***4.7 Linking technological usage and meaning***

If such remittances are contextualized within the greater structure of entrustments and generalized reciprocity then their meaning can be more easily grasped. For the migrant, the remittance transfer had not only economic but also symbolic function. By transferring money, the migrant was also sending an important message—that they had not forgotten their obligation to the village whilst residing in the city. They were sending this message because they did not want their rural relatives to forget the obligation that they have towards them. The meaning of these practices was also tied into the entire world view that emerged from the habitus. Such a world view conditioned not only moral judgements but also ethical commitments. When the urban men were asked why they sent money home, they often responded that it was their responsibility to “take care”, “provide”, and “maintain” their families. Their wives and relatives in the village were well aware of these responsibilities. Those who were considered “good sons” or “proper husbands” sent money back “regularly”. In this case, such transfers were considered “regular” when they conformed to the orchestrated rhythms of remittance practices that occurred at month-end. Those who did not subscribe to such rhythms and sent money home less often, or not at all, were often described as “weak”, “a burden”, and “useless” by their rural relatives.

When the migrants were asked why they send money back home many claimed that it was their obligation to “maintain” their families. When asked why they had such an obligation, many were not able to provide an answer. “This is just how we do it here”, one informant in Kibera explained. “It is an African thing” another made clear. The inability for the urban migrants to explain these remittance practices confirms Bourdieu’s argument that the internalized structures governing such practices exist in the realm of implicit and unstated beliefs. People do not always know why they act. In this case, they could not make explicit

why they sent money home. However, they were all aware that these practices had an important function within their community.

The remittance transfers also had meaning within the separated household. For the rural women, regular remittance transfers were an indication of a healthy marital relationship. They represented faithful husbands. A conversation with a focus group in Bukura revealed the following:

Betrinila: Some men send money home often, and some don't. It depends.

Interviewer: It depends on what?

Jennifer: Those guys who want their wives will send...When they stop sending there is a problem.

Betrinila: [laughs] The problem is usually a city wife. When they stop sending, you know there is a concubine...You can soon expect a surprise. Instead of sending money home, he will send a wife! [laughs]

Jennifer: You can measure how faithful your man is by counting the times he sends money home.

Many of the women explained that the men were more likely to adhere to their obligations as the household head if they “wanted” their wives. A decrease in remittance transfers was a sign that the affections of their husbands were waning. In some cases, this was brought on by a “city wife”. The urban men were aware that their wives interpreted money transfers in this way. As was explained by one urban migrant, “I send money home so she [wife] knows I think of her”. In some instances, the men would reveal their anger towards their wives by not sending money home. One informant explained that he had done this on more than one occasion. “I want her to know I am mad”. In this regard, not sending money home was also imbued with a variety of meanings.

The meaning of remittances practices is important to understand because it impacted how M-PESA was interpreted. Initially, M-PESA was described as a tool for “sending money home” and “maintaining relations” because it was mainly used for money transfers. Because this practice had significance within local norms and systems of logic, many also began to describe the application as being distinctly African, Kenyan or in some cases Luhya. The following excerpt comes from a lively debate that emerged in one of the lexicon groups after the informants were told that there was no application like M-PESA in North America or Europe:

Joshua: The *mzungu* (white person) has no need for M-PESA. These guys are selfish. They don't help each other like the Luhya.

Andrew: It is true. Even if the mobile was created by the *wazungu* (white people) it became African when M-PESA was introduced. Now, it helps the African to take care of their loved ones. It also helps them to survive when there is trouble... We also use M-PESA to find help from their brothers. We also use it to help our brothers.

The mobile phone became something "African" because it included an application that facilitated the maintenance of loved ones, a practice that many informants considered unique to their own culture. This confirms the previous argument that technical variation is central to processes of differentiation and that particular practices are signifiers of unique cultural identity. Many informants considered themselves "different" from the *wazungu* (white people) because they sent money home and took care of their relatives. This finding also confirms that associated practices give meaning to a technology. In this case, M-PESA became a tool for the maintenance of loved ones because it was used for remittance transfers. As was made clear above, such transfers were imbued with such meaning before M-PESA was introduced.

The fieldwork further uncovered that changing practices also altered the meaning of M-PESA. As will be discussed in the next chapter, many began to use M-PESA for savings as they became more familiar with the application. Because of this practice, the words "bank" "account", and "savings" were often used to describe the application. As was made clear by one informant in Kibera:

M-PESA is a bank for the common man...It has even come to Kibera. The other banks are afraid and have stayed out...

The description of M-PESA as being a "bank" for the "common man" can be linked to the general reputation of Safaricom. As was mentioned in the previous chapter, Safaricom made a significant effort to target the low-income segment of the market through its service offerings and advertising campaigns. As a result, many informants explained that the MO was responsible for bringing mobile phone services to the "people of Kenya". A similar argument can also be made for financial services. Unlike the "big banks", M-PESA did not charge fees for the maintenance of the account. It also "came to the people" in Kibera. As was mentioned previously, because of the various security risks formal financial institutions had stayed out of the informal settlement. M-PESA, on the other hand, quickly penetrated the market as agents started to open up on main streets and hidden alleyways. Because the application was affordable and had presence within the community, it is no surprise that

many began to describe it as a bank. This finding is interesting because M-PESA was never designed or marketed as a savings application.

The opposite argument can also be made. The meanings associated with the technology also shape the practices that emerge. Many informants began to use M-PESA for savings because they heard that it was a bank from their friends and relatives. One carpenter in Kibera explained:

At first, I only used M-PESA to send money home to my Mother...But then I heard it is also a bank...So, I tested it out. I took some small money from the home bank and deposited it with M-PESA. When I saw that the money did not disappear, I started to deposit more cash. Now, I deposit a few times per week. M-PESA is my main bank.

This provides an interesting example of the emergence of technological practices. After the carpenter had heard M-PESA could be used for savings, he “tested” this possible usage by depositing a small amount of money in his M-PESA account. When the money did not disappear, he began to use the application more frequently for savings. The carpenter also explained that he encouraged others in the community to also use M-PESA for this purpose. This finding substantiates the aforementioned argument that the construction of technological meanings and practices are inextricably linked. Technological meanings impact the practices that emerge, and these practices also function to give meaning to the technology.

#### **4.8 The non-users**

Thus far, the attention has been focused on the user. However, the non-user is also a vital element in the technological system. This is because resistance and rejection have a vital shaping role; these processes influence how the technology and associated practices are perceived. It must be made clear that the non-users are not a homogenous group. As such, Wyatt’s (2003) system of classification will be used to make clear the distinction. The author notes several categories of non usage. This includes: the *resisters*, who do not want to and have never used the technology; the *rejecters*, who have stopped using the technology voluntarily; the *excluded*, who are marginalized from usage; and, the *expelled*, who have involuntarily stopped using the technology. As will be shown here, each of these also shaped the trajectory of growth.

Within the two sites, several types of non-users were identified. The first were the rejecters. In the rural areas, such rejection often occurred because of cash float shortages. As

mentioned above, it was sometimes difficult for the rural recipients to make withdrawals. This was especially the case during the early stages of diffusion when the demand for M-PESA services was high in proportion to the number of agents that were available in Bukura and surrounding villages. One market seller, who stopped using M-PESA in Bukura, explained:

I registered when M-PESA came to Bukura. My husband told me to register...he said it would be easier for me to get cash...But I stopped using it [M-PESA]. The first time he sent money, it took me over one week to get it. Everyday I would go there [to the M-PESA agent] and wait. Sometimes I would even go too early. But I never managed to get my cash. There were always people ahead of me...These guys [agents] always ran out of cash before they got to me.

The market seller also explained that her husband went back to the previous method of money transfer—the bus company. She was willing to accept the additional costs of this channel (higher cost, longer transfer time) because the transfer was “guaranteed”. That is, she would be able to access her money when making the trip into Kakamega town.

Other rejecters said that they stopped using M-PESA because they were being “cheated” by the agents. The agents received a commission per transaction rather than on the amount transacted. As a result, some would try to increase the number of transactions that were processed in the shop per day by capping the amount that could be withdrawn. In the case of Bukura, the amount was capped at 1000 Ksh. Thus, if the recipient was sent 3000 Ksh, they would have to make three separate withdrawals to get their money. Such frequent withdrawals made the entire remittance process three times more expensive for the recipient as they were being charged per withdrawal. This led some rural dwellers to also change back to their previous method of money transfer. In some instances, the rejecters who were being “cheated” by the agents persuaded others in the community not to adopt M-PESA. This field note excerpt comes from a conversation with a *boda boda* (bicycle taxi) driver in Bukura:

These guys [agents] are not fair...they are taking too much cash. We are all brothers here, and we are all poor. They should not be cheating guys around here. Already, I have told the others...If they don't stop then they will lose customers.

Numerous other informants made clear that they temporarily stopped using the service because they had heard the agents were being dishonest. Such dishonesty was particularly offensive to some of the informants because the agents came from Bukura. These informants made clear that it was “wrong” to betray a fellow member of the tribe. It must be noted that



this practice of over charging customers eventually ceased. One informant explained that the agents were “forced” to stop this practice because they were receiving “pressure” from others in the community. This confirms that non-users also have a vital role to play in the domestication process. In this case, they influenced others to also reject the technology.

The excluded, or those who were marginalized from usage, constituted the second category of non-users. Some of the poorest residents in Bukura fell into this group. They claimed that they had no reason to use this application because nobody was sending them money. One elderly woman, who lived on the *shamba* (farm) with her “drunkard son” and three grandchildren, explained that M-PESA was “a thing for the rich” in Bukura. When asked what she meant by “rich”, she explained that it was those households with lots of connections “in the urban”. She continued that she was forced to “beg” and “live off the land” because she lacked these connections. This finding is interesting because it confirms that an extensive social network is important for the accumulation of economic resources.

Some urban migrants explained that they did not use M-PESA because they “preferred to live alone”. That is, they did not want to become enmeshed in networks of obligations that would “eat up” their money. They thus chose to distance themselves from their community. One way in which they did this was by not sending remittances back home. This finding confirms one of the arguments made earlier in the chapter—sometimes, it is the technological practices that are rejected and not the technology.

Some rural users were marginalized from usage because they did not own a mobile phone. One female farmer explained that she had, on several occasions, asked her husband to purchase a mobile phone so that she could receive money directly. However, he refused. He would not give her a phone because he was “fearful” that she would call and “hassle him for money”. Many of the female interviewees in the village confirmed this finding. They asserted that their husbands would send them money via their in-laws. The in-laws, who usually lived on the same plot of land, would then pass the money on to the women. When asked how they made requests for money when it was needed, the women asserted that they first asked the in-laws to call their husbands. If the in-laws refused, some women would take a loan from their neighbours and visit their husbands in the city. One Mother of three asserted that she would make several of these trips in a year. She explained that her husband rarely sent money since he found a “city wife”:

When I am broke I go and visit him [husband] in Kibera. He stays in a house with his other wife. I wait there until he comes back home. Sometimes I wait for hours...When he comes and sees me he

goes angry. But I always get the cash. The other wife does not want me around. She puts pressure on him to make me leave.

The woman then explained that she requested a mobile phone, with M-PESA, on each of her trips to the city. Her husband, however, refused. He told her that her that he “feared” giving her a phone because she might use to it call and receive money from other men. In this regard, it can be argued that structures of power within the community can affect adoption and usage. Just because an application is available, does not mean that it can be accessed by all members of a community.

Some users were marginalized from usage because of gaps in the infrastructure. As was previously mentioned, the M-PESA system is dependent upon the mobile phone network. There were some pockets in Western Kenya where the GSM signal was weak or non-existent. This constrained access to services. Some users were also not able to access M-PESA because there were no agents in their district. They were thus heavily dependent on transfers made by hand. They also relied on young men who noticed this service gap and found employment as “M-PESA boys”. They would be paid a commission to conduct an M-PESA transaction on another’s behalf. Usually, these boys would receive money on their phone from the urban migrant. They would then retrieve the money from the nearest M-PESA shop, and bring it to the recipient. They charged a commission fee, usually 100 KES, for conducting the transaction. One of the M-PESA boys interviewed, who also worked as a *boda boda* (bicycle taxi) driver, asserted that M-PESA was “good business”. He explained that the “old mamas” (elderly women) in the village would ask him to retrieve their money because they did not want to travel or could not use the application. However, the business of these M-PESA boys declined as the agent network expanded.

The final class of non-users is the expelled, or those who were involuntarily excluded from usage. There were instances in which the customers abused the system in some way and had their SIM cards blocked by Safaricom. For example, the agents explained that on some occasions users had sent money to the wrong recipient. Usually, this happened because they punched in the wrong number whilst conducting the transaction. For the money to be returned to the account of the sender, the transaction had to be reversed by Safaricom customer care. This could sometimes take several hours, and in some cases days. Because of this time lag, there were instances in which the money was withdrawn by the wrong recipient before the transaction was reversed. If this occurred, and the recipient was not willing to give the money back, then their account was blocked and they were prohibited from using the service. However, the excluded usually found ways to circumvent such restrictions. For

example, one informant in Kibera who had been “kicked off” the system explained that he used the account of his brother, as well as his friends, to conduct transactions.

In Bukura, some users were expelled from usage by their rural relatives. For example, one young woman began to use M-PESA to receive money from her numerous admirers in the city. However, she was already engaged to a wealthy man from a neighbouring village. She explained that the family supported the marriage because they expected a high dowry payment. The young woman further explained that her father found out about these numerous transfers when he went through her phone. In reaction, she was “punished”. Her phone was taken away and she was only able to make phone calls to her future husband through her Father’s phone. This again confirms that existing power structures within the community can impact if, and how, a technology is used. Chapter 6 will also show how some of the rural women were blocked from using M-PESA by their husbands. This occurred because the husbands wanted to maintain full control over the rural household finances. They thus took several strategies to ensure their wives were not receiving money via M-PESA from other contacts. One such strategy was to expel them from usage by taking away their phone.

#### **4.9 Conclusion**

This chapter has emphasized several important elements that impact socio-technical systems development, which are not given appropriate attention within the literature. This includes the user, and the non-user. It also includes their associated practices. It was argued that M-PESA was rapidly adopted because it fit into structures of remittance practices that existed in the system’s environment. These practices were maintained because they had meaning within the social structure. The act of sending money home was associated with the nurturance and maintenance of loved ones. Those who were considered “good sons” or “proper husbands” sent money home “regularly”. That is, they adapted their remittance practices to the orchestrated rhythms that existed in the field. Such practices were further associated with processes of differentiation. “African men” were “different” from the *wazungu* (white people) because they took care of their families and sent money home. For some of the rural women, the regular transfers were also an indication that their husbands were faithful in the city. A decrease was often an indication that a “city wife” or “concubine” was on the scene.

The chapter also argued that technological practices should not be studied in isolation. Associated practices must also be understood for the meaning of individual practices to be

grasped. In this case, remittances were situated within other practices of borrowing and lending called entrustment. Such practices were a manifestation of the habitus, which perpetually bound community members through a structure of generalized reciprocity. When manifested in action, these practices constituted an extensive network of exchanges that were made in both cash and kind. Remittances were just one part of this extensive network. The nature and frequency of exchanges was contingent upon the relationship between sender and recipient. Thus, exchanges were more frequent between close kin than distant kin or non-kin. This pattern also became evident with M-PESA transfers.

One of the main aims of this chapter was to contribute to the domestication literature. In particular, a variety of factors that impact domestication in the south were highlighted. This includes familial structures, beliefs about death and burial, migration patterns, property ownership and division of labour within the household. The next chapter will extend the argumentation and empirical findings presented here. In particular, it will show how technological practices began to change with increased usage. The design elements that instigated this change will also be made clear. More attention will also be given to the struggles that occurred within the field for both material and symbolic resources. Such struggles are important to understand because they engendered a variety of social changes. As will be shown in Chapter 6, the social factors that conditioned technological activity were impacted by increased usage.

## **Chapter 5: Explaining changing practices**

### ***5.0 Introduction***

In the previous chapter, Bourdieu's concepts of habitus and field were used to explain not only why practices exist but also why they change. This chapter will continue this discussion by focusing on the numerous struggles that occurred in the field after M-PESA was integrated into daily life. For example, it will show that rural dwellers utilized M-PESA in their strategies of subversion. They began to exploit a wider network of remitters to increase their economic capital base and improve their position with the field. They also began to make more frequent demands for cash from existing contacts. The urban dwellers reacted to these increased demands and cultivated strategies of conservation to protect their economic capital and position within the field. However, they were careful not to deplete their social and symbolic resources whilst doing so. As was shown in the previous chapter, such resources were vitally important because they allowed migrants to solicit help from the village when life became difficult in the city. The struggles will be situated within the vulnerability context. The analysis will make clear that such a context shaped the types of struggles that are manifested and the types of resources that are sought out.

This chapter will also make clear that remittance patterns in general, and technological activity in particular, changed during such struggles. Because of increased demands on their economic capital, urban migrants began to send money "in bits". That is, they deviated from the orchestrated rhythms of remittances practices and sent more frequent transfers of lesser value. The impact of such changing practices will be discussed in the next chapter. Attention will also be paid to savings patterns. The chapter will show that these patterns also began to change when M-PESA was integrated into the savings portfolios of users. Migrants used the application to diversify their savings base and reduce the risk of money being lost. The vital role of intermediaries will also be discussed. These actors facilitated the changing practices and made clear the various unintended usages of M-PESA. The analysis presented here will set the context for the next chapter, which makes clear the outcomes that emerged as a result of changing technological practices.

### ***5.1 The vulnerability context***

To better understand the nature of these struggles, this discussion will be situated within the vulnerability context. This term is used in the livelihoods literature to describe the unpredictable environment in which the resource poor reside. The general premise is that

individuals within this group have a high degree of exposure to shocks (economic crises, political conflicts, civil unrest, human health), trends (population growth, technological change), and seasonality (variation in prices, food availability, employment possibilities). Such events can deplete the resource base of individuals, households and entire communities. They can also result in changes that increase vulnerability. These include, but are not limited to, decreases in employment opportunities, falling incomes, attendant income insecurities, and deteriorating infrastructure (Owuor, 2006). Such events also shape the types of struggles that are manifested and the types of resources that are sought out. The resources mentioned most often within the East African livelihoods literature include livestock, income (cash and in-kind), social institutions (kin, family, village etc.), gender relations and property rights (Barrett, Bezuneh & Webb 2001; Ellis & Mdoe, 2003; Owuor, 2004; Owuor, 2006). Through the accumulation of these resources individuals can more easily cope with, and recover from, the stresses and shocks that emerge within their environments.

The struggles that exist within the field have been termed as livelihood strategies (Rakodi, 1995; 1999; Barrett, Reardon & Webb, 2001). In some cases, these strategies are cultivated in reaction to emergent events. For example, jewellery or livestock may be sold off to cope with unexpected shocks such as illness or death in the family. In other cases, strategies are planned in advance to ensure long-term security and to hedge against uncertainty. Migration is a good example (Ross & Weisner, 1977; Hoddinott, 1994; Bigsten, 1996; Matsuda, 1998; Ageda & Kim, 2001; Ageda, 2004; Ghai, 2004). Through migration, household size is reduced and rural income inflows are increased by remittances. The accumulation of assets, or savings, is another strategy (Shipton, 1995b; Collins et al., 2009; Dupas & Robinson, 2009). Such accumulation reduces the risk of overall income failure. It also facilitates income smoothing during periods of seasonal variability.

Numerous studies also note that diversification is the norm for livelihood portfolios and strategies (Hugh et al., 1991; Reardon, 1997; Ellis, 2000; Barrett, Reardon & Web, 2001). Poor households rarely collect their income from one source, hold their wealth in one asset, or use their assets for one activity. Rather, they constitute portfolios of diverse assets, which have high resilience and low sensitivity to shocks and stresses (Dercon, 2000). In some cases these diverse portfolios help them to survive; in others, they facilitate improvements in living standards. The literature notes that resource poor individuals and households are very strategic managers of their livelihood portfolios; they include assets that are inter-related,

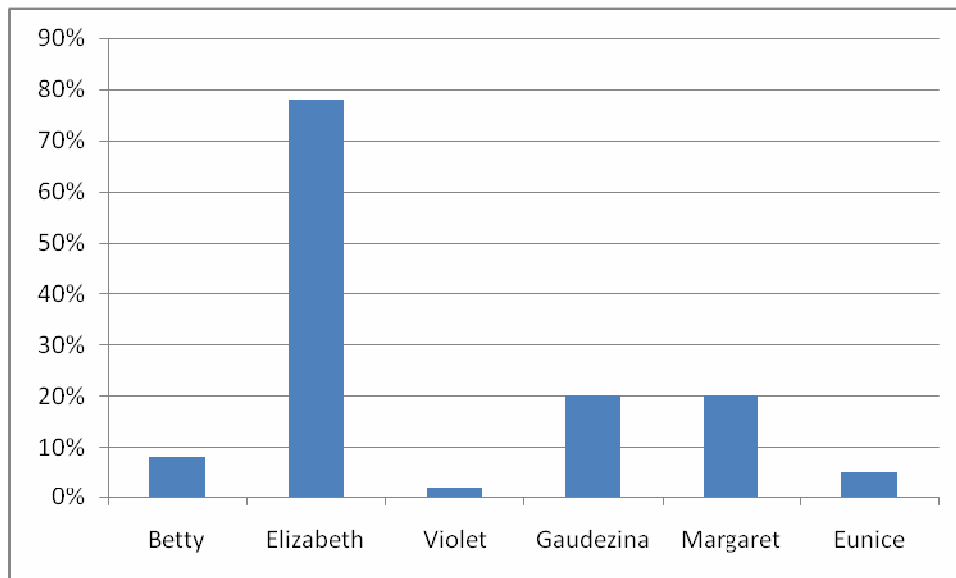
complementary and in some cases substitutable (Rakodi, 1999). Such assets are combined or converted to reduce vulnerability in both the short and long term. The more resources that are commanded in the right mix, the greater the capacity to buffer against external shocks (Rakodi, 1995). The literature also makes clear that each livelihood decision has a cost. For example, strategies to increase short-term income may damage the long-term asset base. The opposite may also be true. Long-term assets may sometimes be depleted to address immediate shocks. Several examples of livelihood costs will be given within this chapter.

The empirical evidence suggests that the extent to which a portfolio can be diversified is directly related to the resources that can be accessed (Silberschmidt, 1999; Valdivia & Gilles, 2001). In most cases, access to resources is differential. It is determined by the social and kinship networks in which an individual is enmeshed. It is also based on the rules and social norms governing the “claims” that individuals can make on particular livelihoods (Ellis, 2000). This idea is best illustrated in Sen’s (1977; 1981) entitlement approach, which he developed to shift assumptions regarding wide-scale famine. His main argument was that people do not starve because there is an insufficient supply of food; rather, they starve because they possess insufficient demand over, or access to, resources.

Location is one reason for differential claims. Several studies have noted that the types of resources that can be accessed, and thus the strategies that can be cultivated, differ across urban and rural settings (Rakodi, 1995; Ellis, 2000; Barrett et al., 2001; Owuor, 2004; 2006). This was certainly the case within the two research sites. For example, the fieldwork revealed that natural capital was vitally important for the residents in Bukura as the residents derived a significant portion of their livelihoods from farming. In some cases, the farm crops were used for domestic consumption; they were also sold on the market for a profit. In regards to the latter, the financial diaries revealed that nearly all of the female participants had at one time sold goods from the farm. In some cases, such sales contributed to a large portion of the income inflows. Gaudezina and Margeret, derived a fifth of their inflows from these sales.

Non-farm sources also contributed to rural livelihoods. As is shown in Figure 18, 80% of Elizabeth’s income inflows came from her business earnings. She sold table cloths on the local market. There were also numerous other activities within the village that allowed the dwellers to increase their income base. As was made clear in the previous chapter, residents of Bukura would fetch water or work on the farms of others. Some also found employment

as *boda boda* (bicycle taxi) drivers or shop-keepers. There were, however, some rural informants who could not access other income sources because of power structures. For Violet, such income constituted only 2% of her total income inflows. Her husband did not allow her to work because he “feared” she would start making decisions in the household without his consent. Eunice, one of the non-users was also not allowed to work and kept on an allowance. Her husband believed that she would “run off” if given too much money. These cases substantiate the aforementioned point—that rules and social norms are a vital determinant of the claims that can be made on assets.

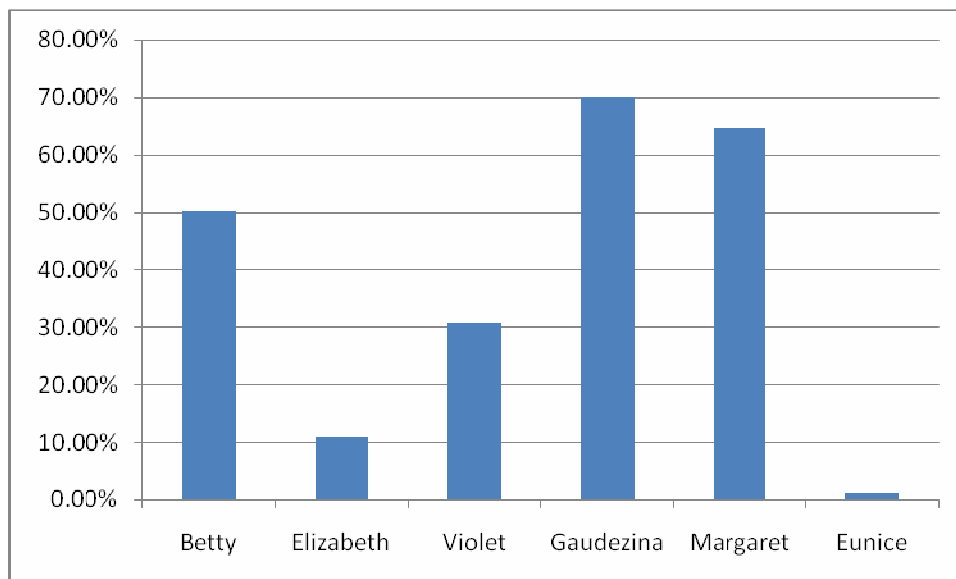


**Figure 18: Waged Activities as a % of Rural Household Income Inflows**

Rural dwellers also had an urban component to their livelihood portfolios. As was mentioned in the previous chapter, an average of 38% of such inflows came from remittances sent by urban relatives. In some cases, this number was much higher. For some, remittances constituted nearly 70% of income inflows. The variation in regards to income inflows are made clear in Figure 19. It must be noted that the rural dwellers who relied more heavily on remittances usually engaged less in waged labour. The opposite was also true. Those who engaged in wage labour saw a smaller portion of their livelihoods emerging from money transfer. For example, Elizabeth derived much more of her income from selling table cloths than she did from remittances. The opposite was true for Gaudezina and Margaret, who relied heavily on remittances and less on their waged activities for their income inflows. This inverse relationship was partially a result of power structures within the household. In some cases, urban migrants wanted to maintain full control over the rural finances. Ensuring that



the rural dweller had limited access to finances was one way to maintain such control. This finding confirms the aforementioned argument of Sen; that is, poverty is partially derived from possessing insufficient access to resources.

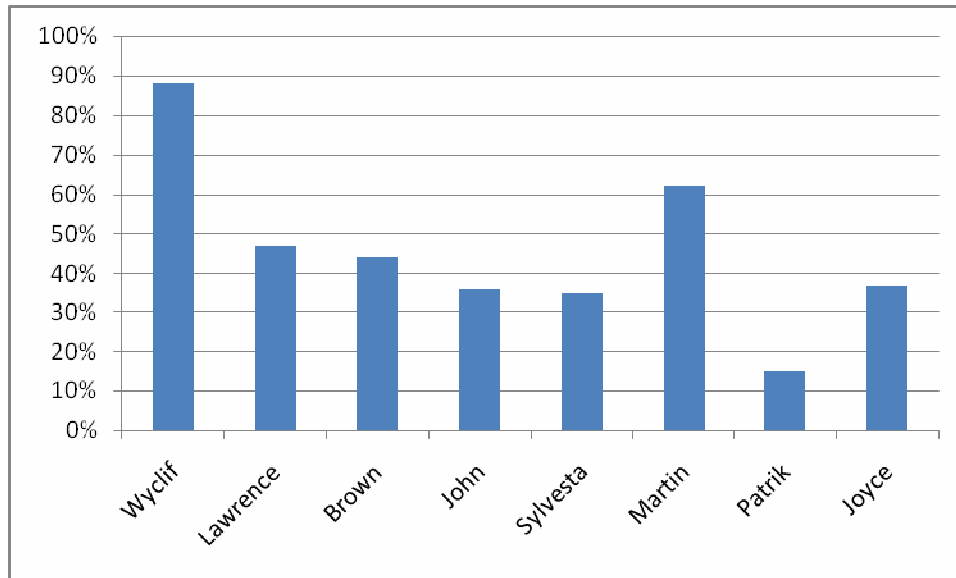


**Figure 19: Remittances as % of Household Income**

Waged labour was an important part of urban livelihood portfolios. Because of the highly commoditised nature of the urban sector, migrants had to rely on market exchanges to obtain basic necessities (food, shelter, water). They also incurred a variety of costs that were associated with urban life. This includes transport, rent, school fees, child care, garbage collection, bribes and access to latrines. The financial diaries revealed that urban migrants spent nearly 1/3 of their income on household consumption, transport and rent. Remittances were also a significant cost for the migrants. On average, the urban participants would remit 12% of their total income back home. In some cases, this number was much higher. Martin, for example, sent nearly one quarter of his income back home. The money was sent to “maintain” his family. It was also sent to make improvements to the farm, Martin explained that he was building a new roof for his home. He was also building an additional hut for his eldest son.

To meet the various costs of urban life, the migrants would engage in both formal and informal sector activities. On average, 41% of income inflows were derived from waged labour. This number was high because, as was made clear in the previous chapter, many of the migrants held several jobs. For example, John and Sylvesta both worked as security

guards. They also ran a small shop in Kibera. A significant portion of the household inflows were also derived from, and put back into, savings mechanisms. This will be given much more attention later in the chapter. The variation in income inflows is illustrated in Figure 20.



**Figure 20: Waged Activities as a % of Urban Household Income Inflows**

The urban livelihood portfolios also had rural components. The previous chapter made clear that most male migrants owned land in the rural area. They derived a portion of their livelihoods from food transfers that came from their land. These were useful because they decreased the amount that was spent on household consumption items. Rural to urban cash transfers were also not uncommon. As will be made clear in this chapter, such transfers were especially important during the post-election violence. For many migrants falling back on rural sources of livelihoods was more of a norm than an exception. This was mainly because of the increasing costs of city life. It was also because of recurrent political shocks.

Both urban migrants and their rural relations relied on what Owuor (2004; 2006) termed “multi-spatial livelihoods”. That is, they exploited their stocks of social capital to mobilize resources from outside of their locality. It must be noted that economic resources were scarce within the two communities. This is why processes of mobilization often involved a struggle. In Bourdieu’s language, such processes were a zero-sum game. Those holding resources were not so willing to give them up. Doing so made them increasingly more vulnerable to shocks and trends within their environment. But they also did not hoard these resources.

Such hoarding would decrease their social capital base, which was vitally important to addressing future stresses and shocks.

This next section will highlight the various struggles that occurred within the field, or more particularly, the vulnerability context of Kibera and Bukura. The shocks and trends that triggered these struggles, as well as the resources sought out, will also be made clear. The analysis will show how M-PESA was implicated in such struggles, and how technological activity changed as a result.

## ***5.2 Cultivating livelihood strategies in contexts of vulnerability:***

### ***Examining remittances***

There were several events and factors that led informants to use M-PESA for the cultivation of their livelihood strategies. One such event, which had a tremendous impact, was the post-election violence. As was mentioned in the previous chapter, the movement of money was constrained during this period; the roads were blocked and the railway dismantled. Informants also had trouble accessing their savings. Many banks and MFIs remained closed because of the constant insecurity. This was problematic because there was a high demand for cash in urban areas during this period. Some migrants needed to escape the threat of ethnic violence. Others needed to purchase basic commodities such as food and water. To meet these costs, migrants exploited their multi-spatial livelihoods. They had their rural relatives transfer cash via M-PESA. Because the money travelled electronically, rather than physically, it was one of the few options for the mobilization of economic capital during the violence.

Some M-PESA agents were operational throughout the clashes. The urban agents asserted that the demand for services had increased drastically during this period. Some even claimed that their customer base had doubled, or tripled. Many agents further saw a fundamental change in the nature of transactions—urban customers were making withdrawals rather than deposits. An agent interviewed in Eldoret explained:

I was serving over 600 customers per day. Guys had no other way of getting money. After they finished the transaction they ran out of here and looked for transport. They wanted to go home.

Several M-PESA users in urban areas like Eldoret and Kibera asserted that the application was vitally important during the clashes. A single mother of two in Eldoret explained that she lost her savings when a group of young men looted and burned her house. She called her

sister, who lived in central province, to ask for help. Her sister responded to the request, and sent her money through M-PESA. This money was used to purchase “daily bread” for the entire family. It was also used to pay for transport back to their rural home. The urbanites were also receiving mobile phone credit from their rural relatives via M-PESA. Because of the road blockages, the supply of scratch cards was limited. In some instances, these cards were being sold at twice their value. An elderly man in Kisumu said that he was receiving mobile phone credit from his brother during the clashes. He was using the credit to text other relatives, and friends, and make additional requests for money and credit.

The months following the disputed elections were characterized by recurrent riots and violence not only within Kibera but also other urban centres. As a result, many of the urban dwellers had to leave their homes. In some cases, their lives were threatened; in others, their property was destroyed. The Kikuyu, an ethnic community of the incumbent President, were particularly at risk. They were outnumbered in the informal settlement by the Luo and Luhya, many of whom supported the opposition government. When the violence broke out, many Kikuyu were displaced and found shelter in refugee camps. One Kikuyu informant, who stayed in a camp just outside Kibera, made clear that life was very difficult; the sleeping facilities were over-crowded and the food was scarce. The camp dwellers thus had to find numerous ways to improve their living conditions. In his case, he would “pay something small” to the staff. At first, he used his savings. When that money was depleted, he used M-PESA. Because several of his relatives sent money, he was able to maintain a balance in his M-PESA account. This balance “sustained” him during his time at the camp. It also made life a bit more comfortable in the over-crowded conditions. This is a good example of M-PESA was used in the conversion of economic into social capital. By making small payments via M-PESA, the informant was building up his social capital base. This made it easier for him to improve his living conditions. It also ensured his claims to food.

The months following the violence were also characterized by high inflation coupled with a very unpredictable labour market. Numerous migrants with small businesses had to remain closed for weeks, and in some cases months, after the violence. Such closures quickly eroded income inflows, which was problematic. As was made clear above, cash was vitally important to the livelihood portfolios of urban migrants. Many thus relied on their rural contacts to “push through” this period. In some instances, the informants had asked these contacts to liquidate assets from the farm and to send money via M-PESA. One informant had his wife sell two of the cows; another, his goats. Some of the rural informants also made clear that they engaged in waged labour following the violence. The money was used for

their domestic needs; it was also sent to their contacts in the city who were “struggling”. These rural-to-urban money flows illustrate the importance of a strong social capital base during shocks. Many of the migrants utilized such capital to mobilize economic resources. They also exploited the structure of generalized reciprocity and called in their numerous debts.

Seasonality also influenced how the application was used. In Bukura, farming cycles determined the financial requirements of the household. For example, the M-PESA agent in Bukura asserted that the shop was busiest during the harvest and planting season. He explained that the financial demands on the farm increased during this period. Farm inputs such as seed and fertilizer needed to be purchased. Additional “farm hands”, who helped with the planting, also needed to be paid. The agent further explained that the traffic in the shop also increased during the “hunger season” or “hunger months”, which usually occurred between March and June. During this period the food stocks from the previous harvest had depleted. Subsistence farmers thus required additional income to replenish these stocks. However, because opportunities for earning cash income were scarce during these periods the migrants had no choice but to turn to their urban contacts for support.

Many farmers utilized M-PESA for the solicitation of income during these periods. They claimed that with M-PESA they could access a larger network of potential remitters or lenders. This increased the chance that they would receive the required funds. An elderly farmer in Bukura claimed that when in need of money he would make requests, via an SMS, to five or six of his relatives in the city. He explained that this increased his chances of getting the money he needed because one of them was likely to “give in and send something small”. The result, as will be described in the next chapter was an increase in the total income inflows into the rural household. Before the mobile phone and M-PESA, the solicitation of money was much more difficult. The message that money was needed had to physically travel to the city. After it reached the migrant, the cash then had to travel back to the village. This process was time consuming, and would sometimes take up to a week. It was also expensive. Transport costs needed to be paid. The various urban costs (food, water, latrines) also needed to be considered. Such costs deterred many of the rural dwellers from making frequent requests. The requests made were also in reaction to more serious shocks, such as severe illness or death in the family.

Seasonal pricing also had an impact on usage. In Bukura, some of the shop keepers would raise their prices at month end. The demand for products was high during this period as many of the villagers received their remittances. To avoid the inflated cost of commodities,

some of the recipients asked their urban relatives to send the money “in bits”. They wanted to receive the money on a bi-weekly or weekly basis. This would allow them to purchase essential items during other periods of the month when the shops had more stock and when the prices were lower. Several farmers asserted that by spacing out their spending, they decreased the total amount spent on household consumption during the month. This provides a good example of subversion strategy. By changing their spending patterns, the rural recipients were able to preserve more of their economic capital. They did this at the expense of the shop-owners, who were no longer able to generate additional revenue by charging higher prices at month end.

The financial diaries confirmed an increase in remittance transfers. The average number of receipts in the village was five, and the median was three. As is shown in Table 11, the majority of remittance transfers came from their urban husbands. However, with the exception of Elizabeth, all of the women received money from other sources. As is shown in the table below, children and siblings also sent money home. The women made clear that, before M-PESA, it was difficult to receive transfers of “small money” with such frequency. This is mainly because the other channels were too expensive. As was made clear by Gaudezina:

Before M-PESA getting small money was tough. Usually, guys just made big transfers because the transfers were so expensive... You could not ask someone to send 100 bob when it cost 150 bob just to send.

M-PESA was able to facilitate such frequent and small valued transfers because it was cheaper than the other money transfer services. For example, sending 1,000 Ksh through M-PESA cost 30 Ksh. This is 27 percent cheaper than the post office’s PostaPay and 68 percent cheaper than sending it via a bus company.

<b>Rural Recipient</b>	<b>Total Transfers Received</b>	<b>Spouse</b>	<b>Sibling</b>	<b>Child</b>
Gaudezina	9	2	2	5
Betty	5	4	1	0
Margaret	4	3	1	0
Elizabeth	3	3	0	0
Violet	3	1	2	0

**Table 11: Transfers Received via M-PESA during the Financial Diaries Period (One Month)**

The number of transfers also increased because the rural dwellers were making more frequent requests for money. This occurred mainly because M-PESA was more accessible. As was mentioned previously, many of the other money transfer options were located in the nearest town. A return trip could cost up to 300 Ksh. There was also a bus company that travelled through the village en route to Kakamega. Sometimes, it would carry envelopes stuffed with cash from urban areas like Nairobi. For the recipient to get the cash, however, they needed to wait for the bus to pass through Bukura. Because the schedule was irregular, they would sometimes wait the entire day for the money to arrive. Because of these various costs, it did not make sense for the rural dwellers to receive frequent money transfers of smaller value.

Many of the urban migrants confirmed that they increased the frequency, while decreasing the value of the money transfers. Martin, the shoe maker, explained:

Before M-PESA, I used Posta [post office] and would transfer money at month-end. Now I send the money in bits. I send every week. Sometimes I send twice in a week. It is cheaper for me to send with M-PESA...so I can send more times.

Martin further explained that he increased the frequency of money transfers to help his wife organize her finances. He said that it was easier for her to budget when she was receiving money on a weekly rather than monthly basis. She would not run out of money before month-end. Sylvesta explained that before M-PESA, he would send money home to his wife once per month through Akamba [bus company]. Now, he was sending twice per week. Like Martin, he explained that he could transfer money home more often because M-PESA was cheaper. The urban participants further noted that they transferred money back home

more frequently because M-PESA was accessible. As mentioned above, users did not need to leave the informal settlement to transfer money. Money could also be transferred from anywhere and at anytime as long as a balance was held in the account. As was pointed out by Martin, “M-PESA never closes”.

The financial diaries revealed that the urban migrants made an average of five and a mean of three transfers during the monthly period. This is significantly higher than the month-end transfers that were recorded during the early stages of the fieldwork. It must be noted that the average was high because Sylvesta, the security guard and shop owner, sent money home fifteen times. Sylvesta explained that he had to send money frequently as his family was large. He had two wives, eight children, nine siblings and countless in-laws. He would often receive requests for money from these family members, and had to transfer money separately to each recipient. He explained that “problems” could emerge if he did not, especially between his two wives. After first registering with M-PESA, Sylvesta had transferred the full amount to his first wife and asked her to split the remitted amount equally with the second. The first wife, however, was not always “honest” and sometimes gave the co-wife less than her share. This resulted in a significant amount of conflict between the two women. To maintain peace in his rural home, Sylvesta bought a phone for his second wife. He also asked her to register with M-PESA so that money could be sent directly. This decreased the conflict between the two women. It also provided the second wife with more autonomy within the home.

John and Joyce, who both worked as shop-keepers in Kibera, had the lowest frequency of money transfers. John explained that his wife and children stayed with him in the informal settlement. He sent money to his rural home to support his Mother. This was also the case with Joyce. She stayed in Kibera with her husband and kids. The money she sent back home was for her grandmother and sister.



Urban Sender	Total Number of M-PESA Transfers	Spouse	Sibling	Child	Parent	In-law	Friend
Sylvesta	15	6	1	2	4	2	0
Lawrence	5	4	1	0	0	0	0
Martin	5	3	0	0	2	0	0
Brown	3	2	0	0	1	0	0
Patrik	3	2	0	0	0	0	1
Joyce	2	0	1	0	1	0	0
John	1	0	0	0	1	0	0

**Table 12: Transfers made by Urban Migrants during the Financial Diaries Period (One Month)**

The urban migrants also confirmed that demands for money had increased significantly since they started using M-PESA. Some even noted that they could no longer “afford” to use the service. On one occasion, a young woman came into the Kibera shop. She asked the agent to “drop her from M-PESA” because the service was making her “broke”. She continued that she was receiving demands for money almost daily since her rural relatives found out that she was a customer. When she refused to meet these demands, some relatives “became difficult”. They would call her until she “gave in”. The woman explained that she had recently lost her job as a teller in a supermarket, and was now living off of her savings. She continued that her relatives did not understand her financial situation: “They think I am rich because I live in Nairobi”. Some of the urbanites also explained that many of the new demands were coming from “distant” friends and relatives. A carpenter in Kibera explained:

I am now getting calls from my distant cousins who are struggling...Some I have not seen in some years. They call and ask for money. They tell me that I should send because it is easy to send. They tell me that they have an M-PESA agent at [rural] home.

Like the carpenter, numerous migrants made clear that they could not afford to “maintain” these distant connections.

There were, however, particular requests that the migrant could not ignore; this included the elderly, it also included the deceased. In regards to the former, one informant in Kibera explained:

When guys get old, they become like children again. They are weak and vulnerable and need help...You can't deny an old mama...because when you are an old mama you will also need help.

This obligation was reinforced by norms of respect and differential behaviour towards kin of a senior age or position. It was also reinforced by the structure of generalized reciprocity. The elderly had accumulated a significant amount of symbolic resources throughout their lifetime. They had taken care of children when they were too young to work. They expected to be looked after in their old age. They utilized their symbolic capital to accumulate cash via M-PESA. Such processes of conversion were made evident in transaction patterns. For example, there was a positive correlation between age and number of transfers. Generally speaking, elderly M-PESA users received transfers more frequently than the young. Elderly males also received money more frequently than elderly females. This is because men, as primary breadwinners and patriachs, had more opportunities to amass symbolic resources. This was especially the case if they adhered to local understandings of "African men" and "maintained" their relations. The elderly quickly realized the potential to call in their debts via M-PESA and signed up as customers. Those who were not able to use the application would receive money through other contacts.

The dead could also not be denied. Funerals in Bukura and surrounding villages were very expensive. Kinsfolk had to leave their jobs in the city for several days, and in some cases, weeks. They also had to contribute to the various expenses. This includes transport (themselves and the body), the coffin, and food. Often, such contributions were rooted deeply in beliefs about death and the afterlife. Many informants explained that they contributed to the costs of burial to appease the spirits. Those who did not contribute or failed to attend a funeral ran the risk of being "haunted". M-PESA became a vitally important tool for the mobilization of resources after death. A lawyer living in Kibera, who had recently lost his Father, explained that M-PESA made it much easier for him to receive cash for funeral expenses. He did not have to wait for his relatives in, and around Kibera, to bring him cash by hand. This allowed him to make the necessary arrangements much more quickly.

Finally, M-PESA helped some Kenyans to generate income by providing them with new opportunities for employment. In villages like Bukura, some of the young men found employment as “M-PESA boys”. As mentioned above, they made money by receiving money on behalf of the recipient. One *boda boda* (bicycle taxi) driver made clear that he made 400-500 KES per week from making such retrievals. This was twice what he made from *boda boda*. M-PESA also helped to create a new type of employment for thousands of Kenyans—as M-PESA agents. There are over ten thousand of these agents all over Kenya. This network is continuing to grow, and penetrate areas in which employment opportunities are scarce. In Bukura and surrounding villages many explained that working as agents provided them with a vital source of income. In some cases, it saved them from migrating to the cities in search of work.

### ***5.3 Cultivating livelihood strategies in contexts of vulnerability: Examining Savings***

The previous chapter also noted an unexpected usage of M-PESA—savings. This was especially the case in urban areas where there were more cash resources to manage and more opportunities to convert these resources into other forms of capital. M-PESA, however, was not used in isolation for savings. Rather, it was integrated into the savings portfolios of the urban migrants and used in conjunction with other mechanisms.

Numerous other studies have taken the portfolio approach to understand the savings patterns of the resource poor (Collins, 2005; Collins et al., 2009). These studies make clear that this segment uses numerous mechanisms in conjunction because, alone, none meet their specific savings needs. For example, money stored in the home is often prone to demands of household members. This is why individuals are willing to pay a significant premium to remove the cash from the household economy. In some instances, they “save backwards” by taking out high interest loans that force them to accumulate cash (Dupas & Robinson, 2009; Collins et al., 2009). In others, they receive negative interest for having others hold their money. Formal institutions also have their shortcomings. Often, they are difficult to access. This is especially the case for those living in rural areas. They are also not appropriate for small savings as most formal accounts demand minimum balances and charge high monthly fees (Collins et al., 2009).

The studies also make clear that material forms of savings (from jewellery to cattle) are important elements in the portfolios (McNamara & Shipton, 1995b; Collins et al., 2009). Such forms are beneficial because they allow savers to circumvent socially imposed barriers.

These forms are indivisible and thus less prone to claims from household and community members. This allows savers to conserve their wealth without appearing selfish (Shipton, 1989; 1995b). Material forms also offer interest, albeit not in cash form. For example, some convert their cash into livestock because the animals breed and can produce milk. These forms also have their drawbacks. In particular, they are less liquid. They may also generate less worth if sold in a hurry.

The empirical studies suggest that the poor are very strategic when cultivating their savings portfolios. The mechanisms integrated reinforce the others, and are combined to meet the unique savings needs of the resource poor. For example, some mechanisms are included to address short term liquidity issues whilst others facilitate the accumulation of cash for future expenditures. It must be noted that these savings portfolios are only a small element, albeit an important one, of the diverse assets held by the resource poor. These portfolios are implicated into livelihood strategies and are used for both the mobilization and the conversion of resources. This section will make clear the distinctions between the savings portfolios in urban and rural areas. It will contribute to the aforementioned literature by explaining how M-PESA fit into these portfolios and just what types of benefits it offers to savers.

### ***5.31 The savings portfolio of M-PESA users***

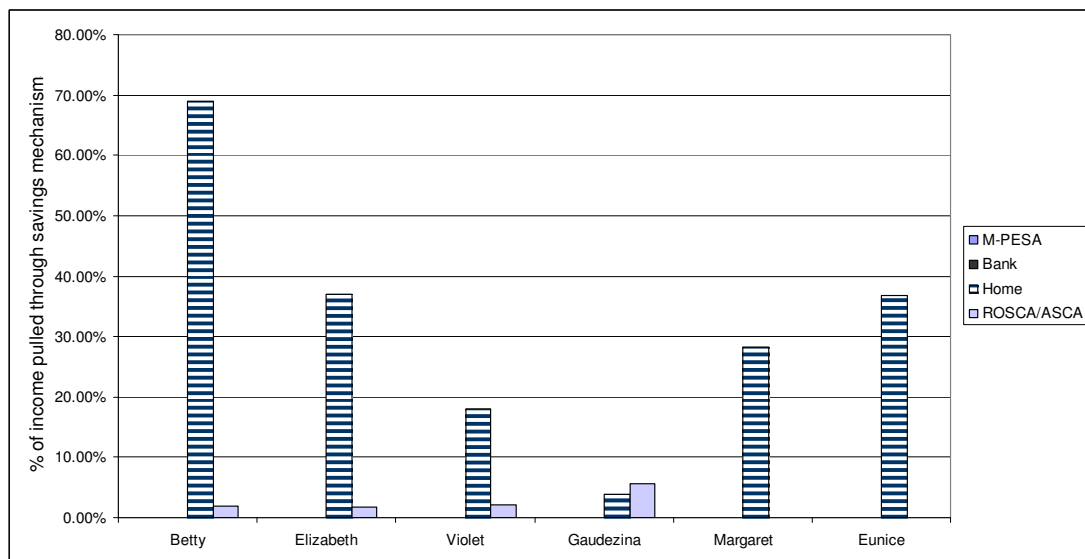
The financial diaries revealed that informants in both sites used numerous mechanisms to manage their limited income and to meet their unique savings needs. The average amount for cash storage in the two sites was just over two. This average was low because the rural savings portfolios included fewer savings mechanisms than the urban. This is because, as was mentioned above, the rural dwellers were less dependent on cash income sources for their livelihoods. They also had lower income inflows with which to push and pull through the various mechanisms. Accessibility and cost of the mechanisms also acted as barriers. Few of the rural informants, and none of the financial diaries participants, used the bank or M-PESA for savings. Many claimed that the former was too expensive. The monthly fees and transaction costs were too high and would quickly wipe out their “small money”. The informants also made clear that the banks were not accessible. Most were located in Kakamega, which was over 20 km away.

M-PESA was not used for savings by many of the rural dwellers for two main reasons. Some did not know it could be used for this purpose. As mentioned previously, Safaricom never advertised this option. Others claimed that they did not use M-PESA to save because cash

was too difficult to access. Because of cash float shortages, customers were sometimes not able to make withdrawals. Betty explained:

My husband told me that M-PESA is also for savings. He said I should store some small money there....Sometimes I go [to M-PESA agent] and have to wait for cash. Sometimes I wait for several days. That is the danger of storing with M-PESA...There is an emergency, you need cash, you don't want to wait for several days...It is better to keep the money close to you.

The rural dwellers made clear that access to cash was very important. As is shown in Figure 21, the home bank was one of the most popular savings mechanisms in rural areas. On average, 32% of household income inflows were kept in this form. ROSCAs, also known as merry-go-rounds, were also popular in the villages. Four out of the six rural women were involved in a merry-go-round. However, only 2% of rural inflows were stored in this mechanism. When asked why so little was stored, some of the rural respondents said that they were a part of the merry go round for social, rather than, financial reasons. The weekly meetings with group members allowed them to catch up on the village happenings and meet with the women from their locality. Others also noted that they participated in these groups because it “forced” them to save. Even though these groups were time consuming, they removed the money from the home and ensured that the women made regular contributions. This substantiates the argument made in the savings literature—that the resource poor are willing to pay a premium to render their savings illiquid.



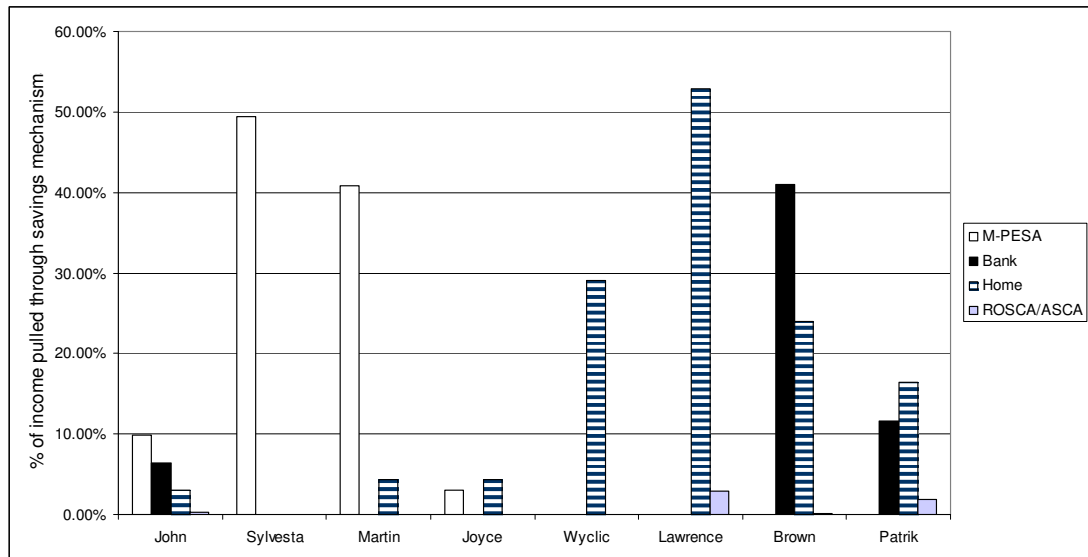
**Figure 21: Savings Portfolios of Rural Diarists**

Many of the rural women further asserted that they also invested a portion of their wealth into material items. For example, Violet and Gaudezina both purchased chickens. The women used the eggs for their own consumption. They also sold them to neighbours when they needed cash. Some informants would also purchase and re-sell items such as bananas and sugar cane. They preferred to “make something small” with her money rather than keeping their cash idle. The informants further made clear that in-kind savings were somewhat risky. There was no guarantee that the material good would be converted into wealth. A buyer had to be located, and a series of negotiations undertaken, before a sale occurred. These savings also rendered wealth visible. This often resulted in more demands for money. Martin explained:

It is important not to have too many cows at [rural] home. If you have too many then guys will think you are rich...When the women need cash, they will go to my wife and request. If she refuses they will call me.

His wife also confirmed that she was “hassled” for holding in-kind savings. This was especially the case during times of hardship such as drought. “You can’t hold cows when your neighbours are starving”, she made clear. To avoid increased demands for cash, many rural dwellers kept only a portion of their resource base in-kind.

As is shown in Figure 22, M-PESA was featured prominently in the portfolio of savings mechanisms in Kibera. Four of the diarists, and many of the informants, used M-PESA to store their money. On average, 26% of such inflows were pushed and pulled through M-PESA. In some cases, this number was much higher. As the graph below shows, Sylvesta and Martin kept nearly half of their income inflows with M-PESA. Numerous informants did not integrate M-PESA into their portfolio of savings mechanisms. In some cases, they did not know M-PESA could be used for this purpose. In others, their existing portfolio of savings mechanisms was enough to meet their needs. It must be noted that Figure 22 only depicts the deposit transactions of the informants. Table 14 illustrates the total number of transactions made with each mechanism, and further shows how the mechanisms were used in conjunction.



**Figure 22: Savings Portfolios of Urban Diarists**

The financial diaries also revealed that M-PESA acted as a complement, rather than a substitute for the most popular mechanisms. That is, it was used in conjunction with the bank, home bank and ROSCA. The application had a vital place in the savings portfolio—somewhere between the bank and home savings. Like the bank, it allowed users to remove money from the household economy and keep it in an account. Like home savings, M-PESA was affordable. Deposits were free, which made the application appropriate for the accumulation of cash. It was also accessible. Those living in Kibera, did not need to leave the informal settlement to make deposits or access their cash. They could also check their balance, at any time, using their mobile phone. Table 13 makes clear the place of M-PESA in the savings portfolio.

It must be noted that M-PESA had some disadvantages as a savings mechanism. As was explained by John, it was not appropriate for “big savings”. Interest was not paid on the money stored. Loans could also be acquired from Safaricom. For these reasons, many kept a bank account in conjunction with M-PESA. They wanted to build a relationship with a formal financial institution so that they could access credit in the future. M-PESA was also dependent on the Safaricom network. Thus, when there were network issues money could not be accessed. This happened several times throughout the course of the fieldwork. When this happened, M-PESA users would rely on the home bank for cash. This was the most accessible form of savings because it never closed. Furthermore, many of the informants explained that with M-PESA they had to “save alone”. Unlike the ROSCA, M-PESA did not help savers to increase their social capital base. It also did not discipline savers to make

regular contributions. Numerous studies have made clear that this is a significant advantage of group savings schemes (Anderson & Baland, 2002; Ambec & Treich, 2007; Gugerty, 2007). Because of these shortcomings, many informants used M-PESA in conjunction with group savings schemes. This will be described in more detail below.

<b>Savings mechanism</b>	<b>Advantages</b>	<b>Disadvantages</b>
Home bank	<ul style="list-style-type: none"> <li>- Free to transact and highly accessible</li> </ul>	<ul style="list-style-type: none"> <li>- Risky-money stored in the home can be stolen by household members or outsiders</li> <li>- No interest is gained on the money stored at home</li> </ul>
M-PESA	<ul style="list-style-type: none"> <li>- Free to deposit and store money</li> <li>- Highly accessible</li> <li>- Secure-customer ID and PIN is needed to access money</li> <li>- Utilizes a new form of value—mobile money</li> </ul>	<ul style="list-style-type: none"> <li>- No interest on money stored</li> <li>- Cash shortages in rural areas can sometimes make it difficult to withdraw money</li> <li>- Not regulated as a savings mechanism, thus funds of customer are not protected</li> </ul>
Bank	<ul style="list-style-type: none"> <li>- Secure method of savings</li> <li>- Interest provided on savings</li> <li>- Potential for credit</li> </ul>	<ul style="list-style-type: none"> <li>- High transaction and maintenance fees</li> <li>- Difficult to access, especially in rural areas</li> </ul>
ROSCA	<ul style="list-style-type: none"> <li>- Allows for the rapid accumulation of funds</li> <li>- Support to save is provided from other community members</li> </ul>	<ul style="list-style-type: none"> <li>- Risky-money can be lost if group dissolves</li> <li>- Time consuming-regular meetings are often required by group members</li> </ul>
In-kind	<ul style="list-style-type: none"> <li>- Material interest gained on some forms of material savings (i.e. Egg, milk)</li> </ul>	<ul style="list-style-type: none"> <li>- Maintenance fees sometimes required (i.e. animal feed)</li> <li>- Low liquidity on some material savings</li> <li>- Potential loss of value over time</li> </ul>

**Table 13: The Savings Portfolio of Low-Income Kenyans**

M-PESA was thus integrated into savings portfolios. It was also implication in livelihood strategies, sometimes alone and other times in conjunction with the other mechanisms. This is particularly interesting because it introduced a new form of value into the portfolio—mobile money (or electronic money more broadly). This form was a viable alternative to material savings for the urban migrants. Because of the spatial constraints in the city and the numerous threats to security, wealth could not be easily stored materially. Mobile money was also more advantageous in regards to liquidity and preservation of value. It could be more easily converted to cash than in-kind savings. There was no need for negotiations



because the value of mobile money was pinned to cash, minus the transaction costs. There was also less risk that its value would erode over time.

Mobile money further provided a viable alternative to cash because it rendered wealth invisible. This allowed savers to protect their wealth against the various risks associated with material forms of wealth (cash and in-kind savings). As was made clear by Martin:

I used to store all the cash at home, but that was no good. Thieves could come in the night to steal the money...Your cash could also be wiped in fire. I store with M-PESA because it is safe...Guys can't get at my cash unless they know my PIN. Even when my phone is stolen, they can't get at it...There is no PIN for home savings.

Mobile money had another important function; it removed cash from the household economy. It thus became vitally important for strategies of conservation, especially for the urban men who stayed in Kibera with their wives. Many of these men explained that the home bank was a "dangerous" place to store cash. The wives would start to make demands if they found the money. "Sometimes she'll ask for cash to send her Mother" John explained. "She'll also want extra for the house...she can't ask for more if she doesn't know what I have", he continued. Some of the men thus minimized the balance stored and home and began to keep more cash with M-PESA.

For the urban women, M-PESA was vitally important for strategies of subversion. The women used the application to accumulate their secret savings. M-PESA was particularly suitable for this purpose because it rendered not only wealth but also financial transactions less visible. For example, some checked their balances via their mobile phones without the knowledge of their husbands. "He thinks I am texting...but really, I am looking at my finances", one urban woman explained. They could also make frequent deposits throughout Kibera because of the extensive agent network.

As was the case with remittances, savings patterns began to change when M-PESA was integrated into the portfolio of mechanisms. In particular, users began to deposit money more frequently into their M-PESA accounts as they became more familiar with the application. As Table 14 illustrates, the median for financial diaries participants was 16. It must be noted that not all of these transactions were for the purposes of savings. In some cases, the migrants would deposit money to make a transfer. Sylvesta had the highest number of deposits and withdrawals. He made 25 of these transactions during the monthly period. A portion of this money was remitted back to his rural home. The rest was kept to meet his

various financial needs. In the case of Sylvesta, M-PESA became a substitute for the home bank. He explained that he preferred to store the cash outside of the home to avoid the risk of money being lost. For the other participants, M-PESA acted as a complement rather than a substitute to home savings. Many informants explained that they relied heavily on their home bank because it was accessible. The only mechanism that remained constant was the ROSCA. The financial diaries participants explained that they continued to participate in savings groups even after adopting M-PESA. This finding confirms that aforementioned finding that many urban dwellers preferred not to save alone.

The diaries also revealed the heavy reliance on home savings amongst the non-users. Both Wyclif and Lawrence pulled the majority of their cash income through this mechanism. Lawrence also participated in several ROSCA groups. Both men expressed the desire for a formal savings mechanism. Wyclif explained that he did not have enough to keep in a bank. Lawrence made clear that he still needed to do some research on the banks to see which best suited his portfolio. Both men explained that they knew M-PESA could be used for savings but had not yet “experimented” with this type of usage.

	M-PESA	Bank	Home	ROSCA
<i>M-PESA Users</i>				
John	18	13	15	6
Sylvesta	25	17	0	31
Martin	6	0	24	9
Joyce	4	3	32	4
<b>Mean</b>	<b>13</b>	<b>8</b>	<b>18</b>	<b>13</b>
<b>Median</b>	<b>16</b>	<b>8</b>	<b>20</b>	<b>8</b>
<i>M-PESA Non-Users</i>				
Wyclif	0	0	31	0
Lawrence	0	0	31	19
<b>Mean</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>10</b>
<b>Median</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>19</b>

**Table 13: Number of Transactions (Deposits and Withdrawals) per Savings Mechanism**

Many banked informants also noted that since adopting M-PESA they had decreased the number of deposits made into their bank accounts. The extent to this decrease, however, is not clear. The informants explained that they did this because M-PESA was accessible. They could thus accumulate a larger sum in their M-PESA accounts by making frequent deposits. This amount then would be transferred into the bank so that it could generate interest. These changing patterns resulted in another interesting outcome—a rebalancing of amounts within the portfolio of mechanisms. Money was taken out of other mechanisms, the bank and home bank in particular, and stored with M-PESA. Such a rebalancing was vitally important. Through portfolio diversification the resource poor were reducing their risk. Money could be accessed from other sources if one of the mechanisms failed.

## **5.4 Changing patterns and intermediaries**

The above sections have made clear that financial patterns began to change as users integrated M-PESA into their daily lives. However, to better understand why these patterns changed the role of intermediaries must be examined. These actors create opportunities and spaces for users to appropriate emerging technological products (Woolgar, 2001; Stewart & Hyysalo, 2008). They further shape the adoption and usage of a technology by engaging in processes of technical and symbolic configuration. They design technologies to fit the needs and desires of users and shape the needs and desires of users to fit the functions of the technology. Through such work, intermediaries help to define what a technology *is*, and what it *does* in the community (Stewart & Hyysalo, 2008).

This study has identified a wide range of intermediaries. These were classified as system builders in the previous chapters. This includes the designers from Sagentia; it also includes the staff from both Safaricom and Vodafone. This section will continue this discussion by identifying two classes of intermediaries that facilitated changing financial practices—the M-PESA agents and the local experts. It will delineate the strategies taken by actors to change practices, and make clear their motivations for undertaking these strategies. This section will give particular attention to the unintended usages that were promoted by the intermediaries.

### **5.41 The agents**

As was mentioned in the previous chapter, there were two types of M-PESA agents. The first were the retail agents who provided cash-in and cash-out services; the second were the super agents who balanced the cash and e-money requirements of the retail agents. This first group of agents will be the focus of this discussion as they had much more contact with the

customers. These agents were vitally important for the enrolment of customers and expansion of the user base. They were usually the first point of contact between the user and M-PESA. Users would come to the shop to register and the agents would inform them about the numerous functions of the application. The following excerpt comes from observations made in the Kibera shop:

Samuel [agent] was working the desk today and registering customers...He greeted a woman that came in and sat at his desk. She told him that she wanted to register and he passed her the [registration] form...He then took her phone and went through the menu options. "This one is send money", he explained. "You can use it to send cash home. You can also send around here, maybe to friends or for work". The woman nodded and looked at the menu. "This one is for credit", he said while showing her the phone. "This one you can use to top-up...You don't need to purchase scratch cards". He then continued to lead her through the other options before handing the woman back her phone.

Samuel explained that it was important to "take time" with the customer and explain how M-PESA could be used. He also made clear that ongoing support was important. "Customers will come to you when they have a problem", Samuel said. "If you can fix it, they will come back. If you don't they will visit the competition". In this case, processes of intermediation were vital to customer retention strategies. Such strategies were important because of the competition in Kibera. As was mentioned previously, there was a wide agent network within the informal settlement.

In some cases, the agents would actively seek out and register customers rather than waiting for them to come to the shop. In Bukura, many of the agents used their personal networks to expand the user base. Bernard, the shop owner, explained that he had signed up many of his "uncles and aunties" onto the application. He also went on "road shows" in neighbouring villages. On these excursions, he would sign up customers and promote the shop. Bernard explained:

Guys around here don't always know about M-PESA...they don't know the benefits. So, we go around and tell them. Then we ask them back to the shop to register...Sometimes these guys fear technology. But we help them get used to it and we show them how it works.

Bernard made clear that he was actively seeking out customers to increase the shop's revenues. As mentioned in the previous chapter, the agents received 80 Ksh per customer registered. He also wanted to increase the number of transactions that were processed in the shop per day. This was another vital form of revenue for the agents; it sustained the business

after the market was saturated with registered users. “First you get them to register”, Bernard explained. “Then, you need to make sure they transact. If you do this, you will make cash”. In this case, the motivation for intermediation was profit driven.

The agents took several other strategies to increase the number of transactions that were made by their customers. Most importantly, they made clear the various usages of M-PESA that were not advertised by Safaricom. This includes airtime top-ups. It also includes savings. In Bukura, the latter usage was encouraged because of cash float problems. Bernard explained that he could cut his operational costs if his customers increased the number of deposits or did not withdraw the entire amount after a transfer was made. He would have more cash on hand and would not need to travel to Kakamega to top-up his float. The agents in Kibera also informed customers of this usage. One of the agents in Eva’s explained:

Customers always come in here and ask whether M-PESA was like a bank. I tell them yes. So they start making deposits not just to send but also to store cash. Before they would come in once a month and now they are coming in three or four times a week...some are coming in every day.

By promoting M-PESA as a savings mechanism the agents were increasing the frequency of transactions and thus their profits. They could not do this with the other usages. For example, most urban migrants would not transfer money more than a few times per month. They also purchased credit only on a weekly or bi-weekly basis. When customers used the application for savings, they would often make deposits several times a week. Some would even transact daily. The agents thus had an incentive to promote this type of usage because they received a commission per cash-in and cash-out transaction.

The agents took another strategy to increase the frequency of transactions. They attempted to match the functions of the technology to the needs of the user. For example, one agent in Kibera explained that he would “size up” his customers. That is, he would assess their characteristics and suggest ways that M-PESA could be used to meet their individual needs. He would tell “business men” that M-PESA could also be used to collect cash from customers, and “market ladies” that it could be used for business savings. By doing this, the agent was making clear how the application could fit into their daily financial practices of the customer. The agents in Bukura also took the same strategy. However, they were better able to match the technological uses to the needs of the customer. This is because all of the agents working in the shop came from the village. They personally knew, and in many cases were related to, many of their customers. As was explained by Bernard:

An old mama comes in here and asks what M-PESA is for. I tell her she can receive cash from her husband or her sons...if she is sick I tell her it is for emergencies. When a young woman comes I joke and tell her she can get dough from her boyfriends...Usually, I know guys from around here. So, if I know a lady has a husband in the city then I tell her he can send...

Bernard utilized the information he had on the needs and social networks of his customers to suggest appropriate usages. Unlike the agents in Bukura, he did not need to “size up” his customers because he had a history of interaction with them. He used the information from such interactions to make M-PESA applicable to their daily lives. This was a significant advantage for the rural agents and facilitated the enrolment of customers.

In some cases, however, these agents acted as roadblocks. That is, their actions impeded processes of adoption and usage. Numerous informants had said that some agents were not properly completing the registration process. For example, one man had entered the Bukura shop to complain. He explained that his wife had met a Safaricom “fake agent” on the street who had persuaded her to register with the service. However, the agent “did something funny” because M-PESA was not working on his wife’s phone. These incomplete registrations were very common after the application was first introduced. Agents who were not properly trained would go from one community to the next registering customers to maximize their profit from the registration commission. These agents were more concerned with the quantity of registrations and would often rush through the process. This resulted in incomplete registrations and left a burden on other agents to fix the problem. Some informants explained that they had a bad first experience with M-PESA because of these agents.

### **5.42 Local experts**

Local experts also drove the adoption and usage of M-PESA. These experts came from a variety of backgrounds and supported these processes in their own unique ways. However, they had several things in common. They were generally more experienced with M-PESA. Some were early adopters and had a significant amount of knowledge regarding the various usages of the application. In many cases, processes of intermediation with local experts occurred in informal settings. They took place in homes over warm cups of *chai* [milky tea], or in pubs over cold bottles of *changa* [local brew]. Such settings were less intimidating than the agent shops. Users had more time to ask questions and to experiment with the various features of the application.

In Bukura, the most important class of local experts were the urban migrants. This is interesting because these experts were not really “local”; most spend the majority of their time in the city. Nevertheless, they provided ample support to their rural contacts via the mobile phone. As was mentioned in the previous chapter, most rural dwellers heard about M-PESA from their urban relations. These dwellers also relied on the urbanites for support. As was made clear by one female farmer:

When I am confused with M-PESA I call him [husband]...I tell him the issue and he helps...If he can't solve then I go to the agent.

Numerous other rural informants made clear that their urban relatives were the first point of contact when they were having “issues” with the application. If the urbanite could not solve the problem then they would seek advice from one of their neighbours. The agents were sometimes a last resort. Many explained that they were deterred from seeking advice from agents because of the long queues.

The migrants had another important role. They explained how the technological features fit into the daily lives of their rural contacts. The migrants were able to provide such advice because they understood the needs of their rural contacts. For example, one of the rural women began to use M-PESA to purchase mobile phone credit. She explained that her husband in Nairobi had told her about this usage to “save her the walk” to the nearest kiosk, which was nearly 2 km away. Another woman stayed in Bukura with her “drunkard husband”. Her sister in Nairobi would send money for her up-keep. Before adopting M-PESA, the woman would hide the cash around the house. That was until her sister told her that M-PESA could be used for savings. Now, the woman withdrew the amount she needed and kept the balance in her account. She also deposited her business earnings into M-PESA. This decreased the risk of money being stolen by her husband.

Return migrants were also important local experts. Many had been exposed to M-PESA whilst living in the city and were able to provide support to community members. The elders, in particular, would turn to these migrants for support. As was mentioned previously, these elders had accumulated a significant amount of social and symbolic capital throughout their lives. They recognized that M-PESA was particularly useful because it allowed them to mobilize economic resources. Many of the younger migrants would lead these elders through the transaction and accompany them to the shop to retrieve the cash. In some cases, they would conduct transactions on behalf of the elder.

In Kibera, many new users depended on local experts within their network of home people. As was mentioned previously, village contacts often accompanied new users to register. They also helped them to make the first few transactions. The local experts in Kibera were often the earliest adopters of not only M-PESA but also the mobile phone. They were thus able to provide information about how the application could be used. This segment was also more likely to test out the other usages. For example, a shop-keeper explained that he had adopted M-PESA only a few weeks after it was introduced. At first, he used it to send money home. Eventually, he left a small balance in the account. After he saw that the money was not lost he began to increase this amount through contributions. Eventually, he began to use M-PESA for savings. He also encouraged his contacts in Kibera to use the application for this purpose. “It can really help around here”, he explained. “Guys don’t have too many safe places for cash. This is why I told them about M-PESA.”

It must be noted that not everyone in the community had equal access to a local expert. Structures of power hindered some from receiving the type of information, or encouragement they needed to adopt M-PESA. For example, many of the rural women would only approach female local experts. They claimed that suspicions could be raised, and accusations of infidelity made, if they went to seek advice from men. Because of these structures, many women had to rely on agents during the early stages of adoption. However, this changed as the user base expanded and more women became familiar with the application.

The local experts were also able to enrol segments of non-users. This includes the rejecters, or those who stopped using the technology voluntarily. For example, a nurse who lived in Kibera stopped using M-PESA not long after she registered because she found the application “difficult”. She did not want to seek advice from the agents, and did not have any close contacts that used M-PESA. Eventually, a friend in her savings group “convinced” her to start using the application. Her friend spent time showing her how M-PESA worked. She also led her through the various menu options. The nurse explained that she was now using the application nearly every week. The local experts also mobilized the resisters, or those who did not want to and never used the technology. Usually, they did this by making clear how the non-user could benefit from the technology. For example, one informant in Kibera explained that she started using M-PESA after her neighbour explained that it could be used for the accumulation of secret savings. She had not adopted M-PESA in the past as she did not send or receive money. The ability of local experts to mobilize segments of non-users was vitally important to the growth of M-PESA. It was often difficult for the agents to access these non-users as they would not come into the shop to seek support.



The local experts had several reasons for providing such support. In some cases, they explained that M-PESA had the potential for “development”; it could “make life easier” for their contacts and engender improvements on a community level. They enrolled their contacts because they also wanted them to reap the numerous benefits of usage. In other instances, it was the local experts who benefited from the enrolment of users. For example, one tailor in Kibera explained that he had convinced his various suppliers to start using the application. This saved him the “hassle” of running around the informal settlement to pay cash. Another structure owner had encouraged his lodgers to pay rent via M-PESA. He explained that he did this because of security reasons. He did not have to walk through Kibera with a sizeable amount of cash in his pockets. Some local experts also provided assistance to increase their social capital base. They could thereafter call in favours from the contacts that they helped.

Both local experts and agents supported processes of adoption and usage in their own unique ways. The concept of the technological script can be used to understand processes of intermediation. As was mentioned in the last chapter, such scripts do not determine action. Rather, they provide a blueprint for the functioning of a technology. The intermediaries helped users to interpret this script. In some cases, they emphasized particular functions. In others, they provided users with an alternative reading. Savings is the best example of the alternative reading. But most importantly, the intermediaries made the script relevant to the users. That is, they not only showed how the technology could be used. They also made clear how such usages were applicable to the patterns of daily life. This was one of the reasons that financial practices began to change.

## ***5.5 Conclusion***

This chapter made clear that financial patterns began to change with increased usage. This was especially because M-PESA became a vital tool for the cultivation of livelihood strategies. It allowed rural dwellers to solicit financial capital from a wider network of urban contacts. As a result money was received “in bits”, or more frequently and in smaller amounts. Savings patterns also began to change as users integrated the application into their savings portfolios. In particular, users increased the number of M-PESA savings transactions. This resulted in a decrease in the number of transactions made with the other mechanisms, the home bank and bank in particular. This allowed savers to diversify their risk. Money was less likely to be lost if spread out over several mechanisms. It also allowed users to accumulate their “secret savings” because it rendered financial transactions and

wealth less visible. This enabled income smoothing during shocks and made it easier for users to plan for future expenditures.

Intermediaries were also vital to facilitating these changes. They were usually the first point of contact between the user and M-PESA. They helped users to interpret the technological script and even provided alternative readings such as savings. The intermediaries also undertook strategies to increase the number of transactions made by the customers. They made clear the various usages of M-PESA; they also matched the functions of the technology to the needs of the user.

It must be recognized that the technology also had a vital role in shaping and eventually changing financial practices. As was made clear in the previous chapter, technologies embody particular tendencies and dispositions in their design. This is something that has not been given the appropriate attention in the practice literature. For example, the tariff structure facilitated frequent transfers. Urban migrants could remit “in bits” because the transaction costs were low enough for them to do so. Furthermore, the fact that the application is situated on the mobile phone has also increased the frequency of transfers. The same technology is used to request, and receive money. This combination minimizes the costs associated with the entire remittance process for not only the sender but also the recipient. It also makes the M-PESA application much more accessible. Most Kenyans have their mobile phones with them at all times. They can easily send money as long as they maintain a balance in their M-PESA account. Remittance patterns have also changed because money is travelling virtually rather than physically. This has drastically reduced, and in some cases eradicated, many of the physical and temporal barriers to money flows. It has also allowed cash to more easily penetrate rural areas, where such barriers are most pervasive.

The design of the application also shaped savings patterns. For example, the tariff structure facilitated the accumulation of cash. This is mainly because deposits were free. It also facilitated the storage of value. Because M-PESA was not a bank, it did not charge monthly or maintenance fees. It also made it easier for users to keep track of their finances. Savers could check their balance without going to the agent. Most importantly, the wide agent network made the application accessible to savers. They could make their savings transactions without leaving the informal settlement.

Such changing practices are important to understand. They engendered several consequences to the daily lives of the informants; some of these were positive and others negative. These will be described in the next chapter, which focuses on outcomes.

## **Chapter 6: Explaining Outcomes**

### ***6.0 Introduction***

This chapter will present the final argument of the thesis. That is, changing practices engendered a variety of consequences to the daily lives of the user. The Outcome Mapping Framework (OMF) will be used to present these consequences. As will be described below, this framework makes a distinction between outcomes and impact. It defines the former as the incremental and subtle changes that occur because of particular interventions. It presents the latter as wider scale transformations that impact various facets of daily life. The framework puts its focus on outcomes. It makes clear that such outcomes are important to understand because they constitute and drive the wider scale transformations. As a result, they can function as predictors of looming societal change.

This chapter will make clear the various outcomes that were observed throughout the fieldwork. Many of these will be linked to the livelihood strategies discussed in the previous chapter. For example, it will show how vulnerability was reduced when M-PESA was used by rural dweller to solicit cash. It will also show how their incomes began to increase as they solicited cash from a wider network of contacts. The unintended consequences will also be highlighted. For example, the empirical findings revealed that urban migrants decreased their home visits since adopting the application. This was a point of concern for the rural women who “feared” that their husbands would become lonely and find a “city wife”. The outcomes presented will be linked to practices. This will substantiate a point made earlier—that savings and remittance usages engendered different outcomes. The chapter will also go one step further by making clear other societal impacts that emerged from usage. For example, it will show that many banks reacted to the rapid growth of M-PESA by launching their own mobile money products. It will further provide evidence that the application has spawned an entire industry for mobile money with new services being piloted and launched in other resource poor countries.

Before this discussion ensues, the chapter will describe how impact has been conceived of in three different bodies of literature. This includes the information technology for development (ICTD), mobile for development (M4D) and branchless banking debates. This review will set the context for the subsequent empirical discussion of outcomes. Such a discussion will

also make clear its contributions to the literature reviewed. The chapter will end with a brief discussion of public-private partnerships (PPP). In particular, it will make clear that such partnerships can engender substantial livelihood improvements if cultivated in the right way.

### ***6.1 ICT and development: The inextricable link***

There is a vast literature discussing whether ICTs can make a substantial contribution to the developmental process. Within the academic community, such literature comes from a variety of disciplines from development studies (Wade, 2002) to information systems (Avgerou, 2002; 2003; 2010) and human computer interaction (Cogburn, 2003; Dearden, 2008). Because of methodological differences, these studies often have different perspectives on *how* innovation occurs and *what* outcomes emerge as a result. Such differences are summarized in a review of literature written by Avegerou (2010). In regards to the *how*, the author notes that the transfer and diffusion approach focuses on process of adaptation. That is, making technologies appropriate to a resource poor context. Less attention is given on the appropriateness and need for that technology within such a context. The social embeddedness approach, on the other hand, looks at innovation from within. It examines how actors make use of the technology and how they adapt it to their daily lives. It further given attention to processes of rejection and examines how contextual factors, from locally embedded power structures to gender relations, can shape the nature of usage.

Within the review, Avegerou also notes that most studies are weak in forming arguments related to ICT enabled socio-economic impact. Most are premised on the fact that ICT usage will engender positive changes in the lives of users and communities. They also assert that technologies will further have wide-scale economic impacts. Most of these studies do not discuss just what these changes are and how they occur. A significant portion of such literature comes from the international development community. Organizations such as the United Nations Development Program (UNDP), International Telecommunications Union (ITU) and the World Bank have released numerous documents arguing that communication technologies can foster wide-scale social and economic improvements (UNDP, 2001; Gilhooly & Lal, 2003) . For example, in a paper commissioned by the UN, Manuel Castells (1999) argues that social and economic development is dependent on a nation's technological capabilities. He makes the assertion that social development will lead to cultural development, which will in turn foster innovation. Such innovation will allow countries to "leapfrog" stages of economic growth by modernizing their systems of

production. He further warns that the retardation will become cumulative for those nations that cannot adapt to new technological systems.

These studies have further noted the emerging gap between those individuals and regions that are “switched on”, or have access to ICTs, and those that do not (Herselman & Britton, 2002; Cogburn, 2003; Roycroft & Anantho, 2003). This gap is commonly known as the “digital divide”, and is said to exist both between and within nations. Although the literature initially defined this divide as one of access to communication technologies, it has more recently noted other factors—such as technical skills, gender etc.—that may hinder the adoption of ICTs. It has also noted that integration into the so-called “network society” demands the formulation of synergistic strategies. This includes the training of new technology users and the development of contextually relevant content.

Various ICTs have been the topic of such a debate. This includes the telegraph (Standage, 1999), television (Colle & Roman, 2003), internet and related applications such as e-government (Basu, 2004; Heeks, 2002; Netchaeva, 2002), telephone (Raiti, 2002; Hamilton, 2003), and the mobile phone and its related applications such as m-banking (Donner & Verclas, 2009). Although these technologies are different in their nature and usage, they have all been hailed as making a contribution to the developmental process. The type of contribution that has been described by the authors is contingent upon the conceptual model of development that is used. In many cases, development has been conceived of as progression towards an ideal form of social and economic order (Smith, 2009). Such an order is usually modelled after Northern countries. More recently, Finland has been used as an example (Schienstock, 2007). The country underwent a very rapid economic transformation during the 1990s, which was characterized by a shift from a natural resource-intensive to a knowledge-based economy. As a result of this shift, Finland emerged from a severe economic crisis. It began to top several global measures of competitiveness and well-being. There have been suggestions that other resource poor countries can reap the same benefits if they follow a similar path.

Much of this thinking is shaped by early theories of development (Smith, 2009). Rostow (1959), in particular is highly influential. The author conceptualized countries as passing through five distinct stages of growth. Each had a distinct technology, mode of production, and social structure. The earlier stages were characterized by agricultural production, centralized political power, rigid social hierarchies and limited technology. The latter by

urbanization, high rates of consumption, and widespread wealth. Technology also had an important role to play in the progression from one stage to the next. It facilitated the radical transformations that drove societies along the developmental path. It also acted as a reward for human ingenuity and progress.

More recent work has extended this logic and hailed the emergence of a new stage that takes a variety of names—the “information society” or “network age” (Forsyth, 1999; Castells, 2000; Grimes, 2000). In this stage, information or knowledge is seen as the key productive resource. ICTs, because of their wide reach and ability to disseminate knowledge, are conceived of as being the markers as well and drivers of this new era. Those who prescribe to the linear conception of development are excited by the idea of this new era. This is mainly because ICTs are more accessible than other productive technologies, and can more easily reach the poorest segments in the most deprived nations. Many argue that this can result in developmental leapfrogging (Steinmueller, 2001). That is, resource poor countries can reap the benefits of this new era without having to progress through the previous stages of development.

There are some who argue that such linear thinking is dangerous (Heeks, 2005; Mercer, 2006; Smith, 2009). This is mainly because it prescribes one trajectory to the development process, which is marked by a very specific set of technologies and accompanying transformations. It can be argued that countries like Kenya and Finland, socially and economically speaking, share little in common. The types of transformations that are expected and marked as “progress” in these two contexts should therefore not be conceived of in the same manner. Many also argue that development interventions and poverty-friendly policies did not drive the transformations in Northern countries. Rather, such transformations were driven by human greed and the unruly dash for wealth (Heeks, 2005). It should thus be expected that it will not work so differently in the South.

Albeit simplistic, the conceptual model of linear development has shaped action. Numerous initiatives have been undertaken by government bodies and development agencies to increase both access to, and usage of, ICTs. The outcomes of these strategies have been differential and often disappointing and there are several examples of technology project “failures”. Such failures have been conceived of in two ways. In some cases, the technology projects were not successful in meeting the developmental goals they were implemented to address (Foster et al., 2002; Heeks, 2005). In this case, these projects failed to engender the

expected improvements. This could be because practitioners set their expectations too high, or were looking in the wrong place for change. Projects also “failed” because technologies were rejected or used in ways not intended by development practitioners (Kulongoski, 2005).

A recent example of such rejection is the One Laptop per Child Project (OLPC) (Kenneth et al., 2009). Created by faculty members of the MIT Media Lab, this project had an ambitious aim—to provide each child in the developing world with a low-cost laptop equipped with educational software and internet access. But several events hindered the permeation of the laptops. Firstly, many governments in the South rejected this scheme. They made clear that it would be impossible to justify such an expenditure. Furthermore, the technology was being used in ways that was hardly “developmental” in nature. For example, OLPC designers in Nigeria had to install content filters. Many of the children were using the laptop to browse pornography (Thompson, 2007). Claire Mercer (2006) also gave an example of such unintended usages in her study of donor funded telecentres in rural Tanzania. She showed that browsing pornographic images and videos constituted one quarter of all internet usage. Another study in Ghana found that the internet was used by youth to realize their ambitions of migration abroad (Burrell, 2009). This segment would go online to build rapport with foreign contacts. Again, this is hardly the “progress” that donors expected.

Empirical research has further challenged another premise that is central to the conceptual model—that entire communities can benefit from communication technologies. Numerous studies of the internet show that internet cafes were not being utilized by the target groups of the development projects (Mercer, 2006). Rather, users tended to be richer, better educated, and younger than their non-user counterparts. Such examples have only strengthened the position of critics, who argue that technological solutions should not be prescribed to deep rooted social problems. Others question the efficacy of the entire debate. In particular, they question whether the conceptual apparatus effectively captures the types of transformations that are actually taking place (Heeks, 2005; Smith, 2009). As was made clear above, many in the development community have aimed for change that is epidemic. That is, change impacting nearly every facet of daily life. This includes modes of consumption, labor relations and even culture. However, as will be made clear below, such meta-change is constituted by a series of smaller scale transformations. By monitoring and understanding these smaller transformations it may be easier to anticipate and predict the epidemic changes that are looming.

## ***6.2 Focusing on the mobile phone***

More recently, one ICT has received a significant amount of attention—the mobile phone. This is mainly because of its impressive growth. The Economist notes that in 2000, a quarter of the world's 700 million mobile phones were in resource poor countries (“A Special Report”, 2009). By 2009, this figure had increased significantly; three quarters of the total phones were in the South. This amounts to 4 billion mobiles in this context. The article further makes clear that the fastest rate of subscriber growth has been in the African region. It provides the example of South Africa, which has already exceeded 100% penetration. It also notes that Kenya is supposed to surpass this mark by 2013. It must be made clear that these penetration figures are not entirely accurate. Numerous users in the South own multiple SIMs and handsets to take advantage of the pricing promotions offered across the networks. The technologies are also shared. This means that many individuals can access mobile phones even if they do not own a handset or SIM. These aforementioned figures do not reflect these ownership and access scenarios.

Even with these slightly skewed figures, the growth of mobile technologies has been profound. If the conceptual apparatus noted above is used, then it can be argued that such rapid growth is a marker of a wide-scale transformation. Millions of resource poor individuals have access to an ICT, the primary technology of the “information era”. Such growth is especially remarkable because it occurred without the help of development practitioners. Rather, billions of resource poor individuals have used their limited income to acquire a handset. They also spend a significant portion of such income on the purchase of airtime credit. As was mentioned in Chapter 1, as household income increases spending on mobile phones grows faster than that on water, energy or anything else (“A Special Report”, 2009).

Because of its rapid growth the mobile has received ample attention from the international development community. This has spawned a more specific body of literature known as mobile for development (M4D) (Donner, 2009; Donner, Verclas & Toyoma, 2009). This debate examines how mobile phones, and related applications, can enhance the developmental process. These enhancements have been conceived of in a number of ways. Some studies have looked for transformations at the macro-level. The best known example comes from Waverman et al. (2005). The authors argued that mobiles have a greater potential for economic growth in less developed economies. This is mainly because they act as substitutes, rather than complements, for fixed line telephony in this context. The study



further noted a critical mass effect of penetration. It suggests that a rise of ten phones per 100 people can boost GDP in the country by 0.6%.

Other studies have looked for economic transformations at the micro-level. Another well-cited example is that of Jensen (2001) who examined mobile phone usage amongst fisherman in Kerala. The study found that wide scale use of mobiles in this context made markets more efficient. Price differentials were reduced and wastage eliminated. Both the fisherman and customers benefited from these changes. Profits went up by 8% for the fishermen whilst prices went down by 4% for the customers. A study of grain markets in Niger also found increased market efficiencies. Aker (2008) noted a 20% reduction in grain price differences across markets. This decrease was a result of behavioural changes of the grain market traders. With the mobile, the traders were able to exploit price differentials across markets. They were further able to reduce their search costs and more efficiently move goods across the country. Customers also benefited from these efficiencies. They were able to purchase more grain for consumption as prices fell.

But research suggests that the relationship between the penetration of mobiles and increased market efficiencies may not be so simple. For example, a study of resource poor farmers in Tanzania did not find a reduction of price differentials (Molony, 2008). The author made clear that farmers usually had to accept the price at which their crops were sold for on markets. This was because their buyers were also their creditors. This limited their ability to exploit other opportunities. Doing so would negatively impact a long standing relationship that allowed them to access credit. This relationship was particularly important because many of the farmers could not access credit from other sources. This example makes clear that increased access to information via the mobile does not always result in beneficial outcomes for users.

Research has noted another vital function of the mobile—it facilitates the solicitation and co-ordination of remittances. In a study of the village phone in Bangladesh, Cohen (2001) noted that a family member living abroad was the most significant independent variable determining phone use. 42% of all calls were made to request, schedule, track, or report the arrival of remittances. These calls also provided the user with a significant cost advantage. It became much cheaper to solicit cash. A single call saved the household from 2.64% to 9.8% of total household income. Horst (2006) further found that the mobile allowed Jamaicans to communicate their specific needs for cash (school fees, uniform). This resulted in more

frequent and more targeted remittance transfers. Such a finding is interesting because it further substantiates the argument made in the previous chapter. That is, remittance practices began to change with increased mobile phone usage. But in this case, such practices began to change because the mobile was used for communication.

The research has revealed another interesting pattern in regards to changing communication patterns. After adopting the mobile, many users increased the frequency of calls made. They also decreased the length of time spent on each call. Such a change was especially noted with calls made to strong links, or those who predated the phone. The notion of “connected presence” has been used to explain this increase (Licoppe, 2004; Licoppe & Smoreda, 2005). Prior to the mobile phone, communication was both spatially and temporally bound and thus demanded greater co-ordination. For example, an individual had to be at home to receive a call on the landline or had to be in front of a computer to send an email. This changed after the introduction of the mobile. Users were no longer bound to a particular space for social interaction.

Changing dynamics of ownership also facilitated increased calls. Since the landline telephone rang in the entire home, there were conventions of courtesy surrounding calls. For example, calls made at night on a land line were often considered inappropriate. This is because the phone rang in the entire house and could risk waking up another member. There were also rules surrounding who could make a call. In some communities, younger household members could not receive calls from the opposite sex because of parental restrictions. The mobile was used to circumvent these restrictions because it made the communication less visible. The call or SMS could often be sent directly to the intended recipient rather than going through other household members.

Specific design features also instigated a change in communication patterns. Many mobile phone users limited their talk time because of the per-minute billing schemes of MOs. They used the mobile to keep in touch during the day and the landline to have longer conversations during the evening. The mobile also provided users with a condensed list of the most important and more frequently called numbers. According to Licoppe (2004) this minimized the cognitive (memorization of numbers, maintenance of address list), and ergonomic (navigation at the touch of a button) effort to make a call. Users began to make more calls because it was much easier for them to do so.

This ability for connected presence has not only changed communication practices, it has also changed the expectations, or notions of appropriate behavior, surrounding social interaction. Firstly, it has put new pressures on individuals to reciprocate contact more quickly. This was made clear in a study of mobile phone usage amongst teenagers (Taylor & Harper, 2003). The authors showed that the entire process of SMS and call reciprocation was imbued with messages. Taking longer to reply to a call or SMS could be seen as a sign of indifference, rudeness or anger. The potential for constant accessibility has also put pressure on individuals to negotiate their availability. Each mobile phone user makes decisions regarding their level of engagement with the technology. For example, they may limit the number of contacts that have their number. They may also turn their phone off at particular periods of the day. Through these actions, callers set boundaries on their availability.

Connected presence has also led to what many authors call the amplification effect (Donner, 2005). This has two dimensions. The first is the strengthening of strong links. This occurs especially in situation in which these links are geographically separated. Studies of the telephone—both landline and mobile—have argued that the technology can compensate for the distance (Licoppe, 2004). It does so by establishing relational proximity that is often threatened by geographic separation. Many studies have shown that there is an inverse correlation between distance and the frequency of calls. That is, the farther the person lives away, the more frequent the communication. This makes sense. In this case, the investment in communication provides a compromise for the deficit created by absence (Licoppe, 2004). The research has also revealed that mobile phones, to some degree, act as substitutes for face-to-face contact (Demirguc-Kunt & Levine, 2008). This is especially true in two cases—if the contact lives far away, and if the link is weak. This occurs because connected presence eventually blurs the boundaries between absence and presence. As a result, it facilitates the constant reaffirmation of existing ties.

Secondly, the research has also shown that the mobile is used to create and strengthen weak links. This was made clear in Donner's (2005) study of microentrepreneurs in Rwanda. By monitoring the call log of this segment he found that the proportion of new entrants grew over time. That is, entrepreneurs started to include new contacts into their communication network. This included business partners, customers and suppliers. The extension of weak links is vitally important for processes of poverty alleviation. This is because they lower the dependence on strong links for economic outcomes. This was made clear in the Horst and

Miller (2006) study. The extensive networks provided a vital safety net for Jamaicans. Such networks were exploited in times of need.

The research also highlights the various unintended consequences that emerge from adoption and usage. For example, Horst and Miller (2006) make an interesting argument—that the mobile phone can have contradictory effects. It can be used to stop crime and organize criminals, hide and detect infidelity, and challenge and reinforce structures of gender relations. Such effects call into question the actual correlation between mobiles and “development”. Donner (2009) has argued that such a correlation is difficult to make because social and economic usages are often blurred. Social functions drive initial adoption. These same functions also inform and shape “developmental” usages in the future. The literature presented above also makes clear that the relationship is not so simple. The types of outcomes noted by the studies are often dependent upon the level of analysis and object of study. Some look for change in GDP indicators whilst others examine alterations in the communicative practices or social networks of users.

### ***6.3 The second wave of mobile development: Enter mobile money***

The Economist has recently predicted a “second wave” of mobile-led development (“A Special Report”, 2009). It has argued that the impacts realized after the initial introduction of the technology will soon be repeated. This so-called second wave is being driven by a change in the conceptualization of the mobile. Many are realizing that the technology is more than a communicative tool; it can also function as a platform on which a variety of other services are delivered. Several of these services have already been introduced into the market. A good example is that of m-agriculture. In some cases, these provide weather and pricing information to farmers. In others, they facilitate the unique concerns of this segment. For example, Farmer’s Friend in Uganda accepts text message queries. The service then dispenses relevant advice from a database of information that has been compiled by locals. A series of m-health services have also been introduced (Mechael, 2009; Morris, 2009). These utilize the mobile to raise awareness of particular illnesses, remind patients to take their medication and to diagnose and track outbreaks of diseases. Because many of these services are still in their nascent stages, there are few studies discussing how they are implicated into livelihood strategies and the outcomes that emerge as a result of their adoption.

Mobile money services are also seen as vitally important to this second wave. These extend the reach of financial services beyond the physical bank branches and usually have two main

objectives (Ivatury & Pickens, 2006; Lyman, Ivatury et al., 2006; Porteous, 2006a; 2006b; 2007; Lyman, Pickens et al., 2008). The first is to minimize the operational costs for the service provider. The second is to make services more accessible to customers. This is both in terms of physical outreach and affordability. Most of these models rely on technology for the delivery of services. This includes automatic teller machines (ATMs), point of sale (POS) terminals, telephone and internet banking, and debit and prepaid cards. These technologies are manipulated in a variety of ways to decrease the cost per transaction and allow for scalability of services. Agents are also vitally important for these models. This is mainly because they facilitate delivery outside of the branch. In many cases, the agents are located in places that are accessible to customers. This includes gas stations, grocery shops, and pharmacies. They are also located in places that cannot be easily accessed by traditional bank branches, either because of infrastructure or cost of building the branch.

More recently the mobile phone has been implicated in branchless banking strategies. This is mainly because the technology is becoming increasingly more pervasive. This makes it easier to offer financial services at scale. The literature discusses two different models of branchless banking that utilize the mobile phone—the bank-led and the non-bank led model (Lyman et al., 2006). The two differ in regards to the ownership of the account. In the bank-led model, the financial institution takes ownership. Users often have a pre-existing relationship with the institution. The mobile simply provides another means through which financial services can be accessed. The term “additive model” is often used to describe this type of branchless banking (Mas, 2009). The additive model is most dominant in Latin America, where numerous bank-based projects rely on cards and POS terminals as enabling infrastructure. M-PESA belongs to the second class of models—the non-bank led. In this model, a non-bank entity has ownership of the account. It must be noted that the bank also has a vital role in this model. It facilitates the management of cash float. It also stores the aggregate sum of cash to back the electronic value in the virtual accounts. The non-bank led model is more dominant in Africa where regulators have given MOs more space to experiment financial services. As a result, a variety of services are offered in this context. This includes domestic and international money transfers, in-store merchant payments, government welfare payments, and electronic commerce. This diverse set of financial services usually falls under the rubric of mobile money.

With the proliferation of new mobile money services the distinction between these two models is becoming increasingly more blurred. Many of these providers are taking the “eco-

system” approach. That is, they are expanding the capability of the mobile money service by cultivating a diverse set of partnerships. Banks and numerous types of non-banks, from MOs to civil society organizations, are working together to expand the financial services offered via the mobile. The goal is to increase the number of transactions processed on the platform. This is usually done by tapping into the various financial exchanges that occur in the daily life of the user, from payments to savings and beyond. As a result of this eco-system approach, users are sometimes able to access more than one account via their mobile phone. For example, Zap money in Kenya allows for the transfer of value between the mobile and bank account. In this model, both the bank and MO have ownership of the transactional accounts. In this regard, many of the newer mobile money initiatives do not fit tightly into the two aforementioned categories of branchless banking.

One of the major concerns of the earlier branchless banking literature was related to adoption. Many of the industry studies questioned whether these applications had the potential to be *transformational*, or adopted by a large segment of the unbanked population (Porteous, 2006a; 2006b; 2007; 2008; 2009; Vodafone, 2007). This phrase was first used in a study released by Porteous (2006a; 2006b), which tracked the development of financial markets over time and identified potential solutions to serve the unbanked. According to his definition, a service becomes transformational when it causes a shift in the access frontier. That is, when a larger segment of the eligible population has access to financial services. The study made clear that not all financial services will have the same transformational potential. It further predicted that mobile remittance products were most likely to shift the access frontier.

If Porteous’ definition of transformational is appropriated then it can be argued that he was correct in his prediction, at least in the case of M-PESA. As was shown in the previous two chapters, a large segment of the unbanked population has been provided with access to financial services through the application. But growth has been driven by remittances. This finding is interesting, especially in the context of the branchless banking debate. The usage that drove adoption is not one that dominates banking transactions. But it is one that is vitally important to informal financial practices, as was shown in the previous chapter. This means that the transformational potential of these applications lies not in their ability to formalize financial practices but rather in their ability to fit into the informal practices of everyday life.

The branchless banking debate has numerous things in common with the aforementioned technology for development debate. Many of the studies also do not distinguish between access and usage. The availability of a financial service is a necessary but not sufficient condition for use. This is mainly because financial practices, just like technological ones, are socially structured and culturally conditioned. This means that financial services may be rejected if they do not fit into the array of social practices that constitute and give meaning to daily life. They may also be accepted and used in ways unforeseen by service providers. For example, Collins et al. (2009) showed that many began to use loan mechanisms to “save backwards”. That is, they take loans that force them to make regular repayments. Such discipline to make regular contributions is usually not built into many savings mechanisms.

The literature further prescribes to the linear thinking that plagues the technology for development literature. Notions of progress are linked to the size, breadth and quality of financial institutions and the proportion of the population that is banked. There is the assumption that access to financial services and the formalization of financial practices will translate to improvements in daily life. The literature argues that incomes will be higher, productivity enhanced and livelihoods improved. But this chapter will make clear that the relationship between financial sector expansion and development is also complex. This is because engagement with financial services has its unintended consequence.

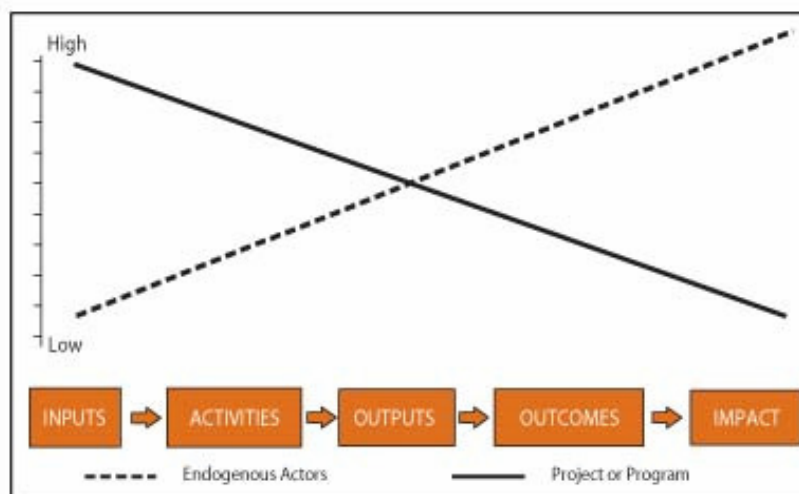
#### ***6.4 Explaining the transformations of M-PESA***

This section will present the third main argument in this analysis. That is, changing practices engendered a variety of consequences to the daily lives of the users. Before such a discussion ensues, however, a conceptual framework for these consequences should be provided. A good starting point is the OMF, which is used by several development organizations to assess the achievements of their interventions (Earl et al., 2001). This approach makes a distinction between outcomes and impacts. It defines the former as changes to behavior, relationships, activities or actions. These occur, at least partially, as a result of development interventions. Such changes are both subtle and incremental and can best be grasped through in-depth research. The latter is conceived of as a sustainable improvement in the well-being of the targeted beneficiaries. Such an improvement usually takes place over a longer period of time.

The OMF uses a results chain approach to illustrate the trajectory of impact and to make clear how the sphere of influence changes throughout the life of a project. As is shown in

Figure 23 below, the donors usually have the highest amount of influence at the input stage. That is, at the stage where the initial conceptualization is done and project partners and location are determined. The balance of influence changes once funding starts to flow, project activities are executed and local partners become more heavily involved. At the outcome and impact stage, the donor influence is the lowest whilst that of the local partners is the highest. Such an approach illustrates that as a project becomes more successful, and moves towards impact, the exogenous influence is supplanted by endogenous activities and institutions (Earl et al., 2001).

This was certainly the case with M-PESA. As was made clear in Chapter 3, DFID had a significant amount of influence at the earliest stages of the project. They provided the funding that was needed for initial conceptualization and design. They also helped to mobilize some of the local partners in Kenya. This includes Faulu Kenya. It also includes the CBK. However, as the project developed, Safaricom and other local partners began to dominate the project. By the time the outcomes began to emerge, the involvement of DFID was minimal. This is interesting in the context of impact assessment because it presents a paradox for donors—if they have been successful in their efforts then their influence should be low when impact occurs. It also makes clear that for the outcomes of development projects to be relevant, and lead towards impact, the local ownership needs to be both effective and dominant.



**Figure 23: The Results Chain (Smutylo, 2001)**



The OMF is also interesting because it puts its attention on outcomes rather than impact. The argument is that such outcomes are important to understand because they constitute the developmental impacts that occur in the future. The outcomes also function as predictors of the impacts that are looming. It must be noted that the framework does not establish a cause and effect relationship between outcomes and impacts. Rather, it recognizes that multiple and non-linear events often lead to a larger change. This is because outcomes are inter-related. That is, each outcome shapes, and is shaped by, others in the environment. Because of such inter-dependencies, it is important to isolate the key factors that caused the desired results. It is also vital to attribute these factors to a particular set of activities.

But this raises an interesting question. How can the range of inter-relations that exist between the outcomes be grasped? The case of M-PESA can be used to explain why it is important to ask such a question. This chapter will argue that changing technological practices led to a variety of consequences to daily life. If the framework is used to conceive of this relationship then both the changing practices and their consequences can be categorized as outcomes. In this case, the intervention that caused these outcomes was the introduction of M-PESA. It can further be argued that, because outcomes are inter-dependent, a simplistic correlation between changing practices and outcomes cannot be made. Other events in the environment may have also contributed to the discussed outcome. An analysis of impact must also take these external events into consideration.

We can revisit Sharpe's example of the steel axe to substantiate the points made above. The cultural degradation that occurred after the introduction of this axe was constituted by a multitude of smaller scale outcomes that took place before the meta-change. For example, many of the Maori women received steel axes from the missionaries. They began to use the technology for their daily chores. This made them less dependent on the men, who not only owned but also controlled the stone axes. According to Sharpe, this led to the "revolutionary confusion" of sex, and gender roles. The women who owned axes were no longer subject to subordination by male counterparts. Relations between men in the community also began to change. Much social interaction revolved around the production and exchange of the stone axes. The permeation of the steel axe led to a decrease in such interaction. It also altered the norms of reciprocity that bound the men together. The eventual result was the weakening of kinship structures. All of these smaller events are important to understand because they constituted the eventual degradation of the Maori culture. They also foreshadowed the larger scale transformation that was coming. This example substantiates one of the main arguments

of the aforementioned framework—that multiple and non-linear events lead to a meta-change.

It must be noted that other events also led to this transformation. The most significant was exposure to European explorers and missionaries. Besides distributing a variety of technologies, these Europeans spread their ideas regarding gender equality and “ideal” social forms. Exposure to such ideas also facilitated a change in social practices. This point is important to understand because it makes clear the complex inter-relations of the outcomes. It also challenges the linear thinking that pervades the technology for development debate. Communities cannot proceed through distinct stages of “development” or progress because the outcomes that lead to these stages are not only contextually contingent but also dependent on a number of historical events.

The example of the steel axe further makes clear that outcomes, as well as impacts, are not always positive. In this case, cultural degradation was marked by a conflict between men and women in the community as gender roles were re-negotiated. It was also marked by a weakening of relations between community members. The framework gives less attention to such outcomes because it aims to identify the positive effects emerging from development interventions. This thesis will extend this limited scope and make clear the negative outcomes that emerged from usage. This discussion is important because, as was made clear in the previous chapter, struggles are a vital part of social transformation. Some engage in struggles of conservation to protect the social order, whilst others engage in those of subversion to challenge the place of the dominant group. Any larger societal change is thus driven, and marked, by these struggles.

The next section will present the outcomes that emerged from changing technological practices. Whenever possible, it will elucidate the other factors that contributed to the discussed outcome. The aim of this discussion is to challenge the inextricable link that is made between technology and development in the literature by pointing out that the events leading to impact are both complex and inter-dependent. The discussion will further substantiate the argument made in the previous section—that if we look for change on a grand scale then we may miss all of the vitally important smaller transformations that occur in the daily lives of the user.

### **6.41 Reducing vulnerability and increasing household income through remittances**

One of the most significant outcomes that emerged from usage was a reduction of vulnerability. This occurred when the application was implicated in livelihood strategies. The outcomes that emerged from these strategies can be grouped into two categories (Alwang et al., 2001; Devereux, 2001). The first are the *ex post* action outcomes. These are the result of strategies cultivated after a shock occurs. These are meant to help the resource poor cope with the consequences of the unexpected event. Many of the outcomes discussed here fall into this category. The second category includes the outcomes emerging from the *ex ante* actions. These are cultivated in anticipation of shocks. They aim to reduce or lower the exposure to risk. The diversification of livelihood portfolios and rural-urban migration can both be classified as *ex ante* outcomes.

When used for money transfers, the majority of outcomes were derived from the *ex post* actions. Several examples of such outcomes were given in the last chapter. For example, the application was used by farmers to cope with seasonal shocks such as the hunger months. These farmers would solicit cash from a large network of contacts to “push through” the period. Furthermore, M-PESA was one of the only means through which money and airtime could be acquired during periods of escalated violence. As a result, it became vitally important to coping strategies. In some cases, money received via M-PESA was used to purchase “daily bread”. In others, it was used to escape the threat of ethnic violence.

In both of these cases, M-PESA generated a network effect. That is, the usefulness and value of the service increased as the customer base expanded. This occurred because each new user also became a potential remitter and lender. Many tapped into this extensive financial network when cultivating short-term responses to unexpected events. They did so to increase their chances of receiving the required amount. The application further reduced many of the spatial and temporal constraints on money flows by allowing cash to flow through the extensive network in electronic rather than physical form. This increased the speed at which individuals could react to shocks. It also reduced the total costs associated with the coping process. As will be described below, such costs are cumulative and likely to grow if immediate action is not taken.

The importance of rapid money transfer was also made clear during situations of illness. For example, one elderly woman explained that she and her husband looked after her daughter

who was “positive” (HIV). Under normal circumstances, her husband who stayed in Kibera would send 1000-2000 KES per month. During some periods, however, the financial requirements of the household increased as the daughter’s condition worsened. Money was needed to purchase medicine and to pay for hospital fees. The woman explained that M-PESA made it easier to treat her sick daughter. Before M-PESA she would spend time soliciting loans from her neighbors. She would repay these loans when her husband sent the money. However, the informant made clear that such loans could be expensive when the lender demanded interest. In this case, the vulnerability of users was reduced because they were able to solicit the necessary funds more quickly. This allowed them to react to unexpected events with immediacy. It further lessened the costs associated with the management of the crises, such as interest on money borrowed.

The application also allowed money flows to be spaced out through time. As was made clear in the previous chapter, urban migrants began to send money “in bits”, making more frequent transfers that were smaller in value. Such a change in remittance practices had several important implications for the management of household income. Many informants began to spread out their expenditures in correspondence to the frequency of transfers rather than purchasing in bulk at month-end. This made it easier for them to circumvent the price hikes of shop-keepers. It also helped them to avoid “going broke” before the next transfer arrived. Some informants further made clear that they were better able to manage household stocks, such as sugar or maize, when purchases were spread out. Because these stocks were no longer purchased in bulk, villagers could more easily assess the household needs and avoid recurrent stock deficits at month-end. Although the fieldwork was able to capture the changing consumption patterns, more research is needed to examine just how such changing patterns reduce the vulnerability of rural users in the longer term.

M-PESA facilitated another outcome when used for money transfers. It allowed rural users to smooth consumption by addressing stock deficits in the short term. One informant in Bukura made clear:

Before I would get the cash at month-end...I used that cash for milk, sugar, fertilizer and other things. Then M-PESA came and I can request. I don’t just tell him [husband] to send cash. I tell him to send cash for fertilizer...or for maize because there is none left... So, now he knows. If he does not send then we will go hungry...He can’t say that he didn’t know because I tell him.

Requests for money not only became more frequent but also more specific after M-PESA was adopted. In this case, the informant would communicate the specific food deficits during the weekly conversations with her husband. He would then react by sending her the appropriate amount. Before the mobile phone, such solicitation was more difficult because the migrant was not aware of the particular needs of the rural contact. In many cases, the deficit was addressed only when a transfer was made at month end. If the situation was urgent then the rural dweller could send a message to the migrant in the city. However, this was rare because such a process was both time consuming and expensive. This example makes clear the inter-relationships that exist between the outcomes. In this case, remittance patterns changed because the mobile phone facilitated more frequent communication. This allowed the villagers to convey the need for cash more easily. This finding also confirms some of the arguments presented in the previous section. The first is that the mobile phone is vital for the solicitation and co-ordination of remittances. The second is that increased usage resulted in more frequent and targeted remittance transfers. From these findings it can be argued that the mobile is one of the most powerful tools for the mobilization of economic capital in general and remittances in particular.

This phenomenon of receiving money “in bits” instigated another interesting outcome—rural income inflows began to rise. Throughout the course of the fieldwork, 70 recipients were asked whether household income had changed since they adopted M-PESA. 54 (77% of this sample) noted an increase in such income, whilst 16 (23%) asserted that there was no change. Out of the 54 noting an increase, 38 gave figures on how much they received before and after adopting M-PESA. For 35 of these respondents, this increase fell between 5-30% of total household income. Two reported lower increases (1-5%), and one a higher increase (44%). The senders asserted that they were able to send more money because they saved on the act of making the transfer. As was noted above, M-PESA is significantly cheaper than the other popular money transfer channels. A shoemaker working in Kibera described this change:

Shoemaker: Before M-PESA, I would give money to my friend. He would go home every two months...I usually gave him 2000 [KES] for my wife and parents. I also contributed 300 [KES] for his transport, and another 200 [KES] to say thank you.

Interviewer: So, you sent about 1000 per month.

S: [Nods].

I: And now?

S: Now I am sending every two weeks. But I send a smaller amount. Usually 700-800 [KES]. I can send her more because I save on the transport cost. I also don't pay my friend.

I: Now you are sending about 1400-1500 per month? Your wife must be happy.

S: Yes. [laughs]. But my friend is not.

The wife of the shoemaker, who stayed in Bukura, confirmed this increase. She also asserted that since her husband started using M-PESA, the inflows of money became more regular. He no longer needed to depend on his friend to transfer the cash.

There are several reasons why such an increase occurred. The urban migrants claimed that they would include the amount saved on making the transfer into the amount sent back home. In most cases, the amount saved was from 50 KES-400 KES. The recipients also noted that they saved money because they no longer needed to pay transport fees to collect the money. One woman, who stayed in a small village near Bukura, explained:

My husband used to send me money through Akamba [bus company] before M-PESA. I used to go and pick the money at end-month in Kakamega....The journey was expensive. I had to borrow 100 bob [slang for Kenyan shilling] from my neighbours for the matatu to town [Kakamega].Then I had to pay 100 bob to come back...I paid 200 for transport to pick the money. Now I walk to Bukura when my husband sends...I can keep my 200.

The wide agent network, and presence in rural areas, made it easier and cheaper for recipients to get their cash. Villagers were able to avoid one of the greatest expenses associated with the remittance process—transport. In some cases, nearly one third to the amount received was used for the collection of the cash. Such an increase in household income was vitally important. As was mentioned in the previous chapter, an average of 38% of income inflows into the rural household were derived from remittances. In some cases, this number was higher. For some of the rural participants, remittances constituted nearly 70% of household income.

Such an increase also occurred because M-PESA made it easier for rural dwellers to make claims on resources. Some expanded their network of remitters and began to solicit “small money” from distant kin and relatives. In some cases, this cash was used to address unexpected shocks that emerged. In others, it was used to prepare for future ones. For example, one farmer in Bukura explained that he made requests for cash from several relatives before the hunger months. He continued that it was more difficult to acquire funds

during this period because his urban contacts were overwhelmed with demands for cash from other relatives. Thus, by making the requests early the farmer was increasing his chance of acquiring the cash needed to sustain himself and his family during this period. Villagers would also solicit cash only to build up a reserve of precautionary savings. As will be described in the next section, this money functioned as a form of insurance. It was used to address unintended events such as illness. These findings make clear that *ex ante* outcomes also emerged from usage.

It must also be noted that external events also contributed to increased incomes. As was mentioned in Chapter 1, there was a significant amount of inflation in Bukura because of the post-election violence. The average amount within one of the shops visited was 22%. Because of such inflation, many of the rural dwellers required more cash and increased their requests for remittances. This example makes clear the inter-relation of outcomes. Income inflows also increased because rural dwellers were reacting to the recurrent price shocks that followed the violence. Thus, higher income inflows did not necessarily translate to increased purchasing power. In some cases, the additional cash was used to smooth consumption and adjust to the volatile pricing. For those who did not have a savings base, the solicitation of cash from urban contacts was one of the only ways in which they could react to such volatility.

The evidence of changing remittance practices and rising household incomes is a vital contribution to both the ICTD and M4D debates. In regards to the former, many studies have argued that information is the key resource of the network age. However, in the case of M-PESA this was not the case. Positive outcomes were engendered because the application facilitated the transfer of another vital resource—cash. This resource was important because it could be directly implicated in the cultivation of livelihood strategies. This was not the case with information, which often provided a means to an end. The findings can also be used to argue that communication and money transfer usages engender similar outcomes. Increased mobile phone usage resulted in more frequent and shorter calls. The outcome was more time spent on communication. The increased usage of M-PESA resulted in more frequent transfers that were smaller in value. The result was increased rural inflows.

Such changes were engendered by the feature of connected presence. The mobile facilitated not only perpetual communication but also perpetual money transfer. This feature of continuous connection allowed users to tap into the extensive lender and remitter network

whenever they needed cash. This was vitally important for the cultivation of livelihood strategies. Users could react to shocks and trends with more immediacy. Transfers via the mobile were also not spatially bound. This flexibility lessened the effort associated with the entire remittance process. Users did not have to leave their home to make a transfer if they maintained a balance on the account. This finding also confirms a point made in the mobile phone literature. That specific design features can facilitate changing practices. In this case, the application minimized both the cognitive and ergonomic effort required to make the transfer. This was another reason for the increase in remittance transfers.

As was the case with the mobile phone, changing remittance practices were also accompanied and driven by changing expectations around these practices. Because money was easier to transfer, remitters were expected to send money home more often. Those who wanted to amass symbolic capital and to be seen as “good sons” or “proper husbands” began to send money home more than once per month. The mobile phone, when used as a tool for communication, also contributed to this change. It made it easier for those seeking funds to request money. This put pressure on the recipient to communicate a response and to make a transfer. This finding is interesting because it provides evidence of changing rhythms. In this case, more frequent remittance transfers were becoming the norm rather than the exception. However, not everybody was ready to adjust to this emerging rhythm. As will be made clear later in the chapter, some migrants engaged in strategies of subversion to keep the status quo.

Connected presence also led to another similar outcome when the mobile was used for remittance transfers—the amplification effect. The research showed evidence of strengthening weak links. As was discussed in the previous chapter, migrants responded to requests for “small money” from distant kin and relatives because it was easier and cheaper for them to make the transfer. However, the requests also implicated the migrants into additional struggles for their limited resources. In many cases, their income levels decreased as a result. This finding is particularly interesting because it challenges an assumption in the literature on mobile phones. That is, the strengthening of weak links is vital to poverty alleviation. For the urban migrants, the benefits of such networks were not so clear. However, additional research is needed to examine if, and how, these migrants will benefit from the wider networks in the future. The research found contradictory evidence in regards to the amplification of strong links. In some cases, the rise in money transfers back home could be taken as evidence of strengthening relations. This is especially if the argument is accepted that such transfers provided a compromise for the deficit created by distance.



However, one of the outcomes of increased transfers was decreased home visits. This finding makes clear that the relation between usage and amplification is not so straight forward. It can be argued that if migrants continue to decrease the number of home visits the relation with their rural relatives will be diluted as a result.

The aforementioned findings also make a substantial contribution to the branchless banking literature. Many studies in this area note the importance of connecting the poor to formal financial institutions via the mobile. The authors emphasize that such connections are vital for poverty reduction. However, the empirical evidence suggests that the major benefits of mobile money services are derived from informal money transfers that occur between kith and kin rather than new relationships that are cultivated with formal financial institutions.

#### **6.42 Reducing vulnerability through savings**

When used for savings, M-PESA resulted in a variety of *ex ante* outcomes. That is, it helped users to prepare for future shocks through the accumulation and preservation of cash. M-PESA was suitable for this purpose because it was easy for savers to get money into the system. Many utilized the extensive agent network to make deposits of “small money” and to build up a reserve of cash. The fee structure also facilitated savings as deposits were free. In some cases, users had a balance in their account from previous money transfers transactions. Rather than removing the cash, and shifting it to another mechanism, some kept the balance in their M-PESA account. This provides an interesting example of the inter-relationship of outcomes. In many cases, individuals started to use M-PESA for savings not because they put money into the system but because they did not withdraw the cash after a transfer was made. They began to increase their balance only after “testing out” the system and gaining confidence that their money would be safe.

The cash stored in M-PESA was used to reduce vulnerability in a number of ways. One of the most common was consumption smoothing. For example, some of the women accumulating secret savings in Kibera used the cash to purchase household items when their husbands “refused” to give them money. Sometimes this occurred because the husband “drank” his wages. It also occurred because he lost his job. In these cases, the women would use the cash to purchase staple items such as maize flour and milk. Some of the women also used the application to store their precautionary savings. In some cases, these savings had a distinct purpose. School fees was most often mentioned. One female informant in Kibera explained:

I put away money every week for his [son's] [school] fees...Sometimes it is 50 bob, sometimes more. When it is time to pay fees I have some cash. So, if my husband cannot pay then I go to school and give the money...Then he [husband] finds out that Isaiah [son] is in school and is shocked. He has no idea how I got the cash to pay...but he can't say anything because it is paid.

The informant further explained that money stored in M-PESA was less likely to be stolen by her husband. In fact, he did not know that she used this mechanism for the storage of cash. This was a significant advantage of saving with M-PESA. The cash was stored in electronic rather than physical form. This rendered cash illiquid and removed it from the household economy where it was prone to demands and more likely to be found by thirsty husbands.

For many of the women, this savings base was important because it provided them with more autonomy within the household. They could pay the school fees when their husband ran out of cash. They could also use the cash to address food stock deficits at home. In some instances, the women used the accumulated amount to increase their social and economic capital base. This occurred when they lent out the money to others in the community. Through such loans, they were improving their social relations with the borrower. They were also increasing their income levels by generating interest on their savings. However, such loans also came with a variety of problems. One of the informants explained that she had lost a significant portion of her savings when the borrower “ran off” with the cash. Tensions also emerged when the borrower could not pay back the loan on time and the terms had to be re-negotiated. By lending out their cash the lender was also rendering their savings inaccessible for a period of time. This made them more vulnerable to the shocks that emerged.

Many informants noted productive uses for the stored amounts. For example, a carpenter in Kibera explained that the money saved with M-PESA would eventually be used to “build his business”. He was currently working for his cousin but had plans to also break away and start his own small enterprise. He continued that he needed 4000 Ksh to purchase equipment and to pay rent on a plot behind Kibera drive. He preferred M-PESA to the other savings mechanisms because he could keep track of his money. The system provided him with a balance after every deposit. This kept him “motivated” to continue making the deposits. The carpenter explained that M-PESA was his first “bank”. He had recently moved to Kibera from North Eastern province and had never had an account with a formal financial institution.

This finding is interesting because it reveals that the integration of M-PESA into the portfolio of savings mechanisms could have some negative implications in the future. It can be argued that the application may act as a substitute for a formal account. Those who consider and use M-PESA as their “bank” may delay from entering the formal financial sector, especially if they see the application as a viable alternative to a formal account. This could have several outcomes. It could limit the ability of savers to build credit histories and to access credit from formal institutions in the future. It may also result in less diverse portfolio of savings mechanisms. As will be described below, such diversity is important because it reduces the risk of savings being inaccessible if the one of the other mechanisms fails.

In some cases, the opposite could occur. The unbanked may realize the benefits of removing cash from the household economy once adopting M-PESA. They may also become more familiar with the concepts and processes related to banking because of the application. For example, many of the unbanked were introduced to concepts such as PIN, account and balance after they adopted M-PESA. However, more research is required to determine just how relationships between the unbanked and formal financial institutions are changing because of the introduction of the application.

M-PESA lessened the vulnerability of savers in another important way. By diversifying their portfolios through the integration of M-PESA, and utilizing mobile money in conjunction to cash and material forms of wealth, the informants were better able to react to shocks within their environment. This was made clear during the post election violence. Because the demand for cash was high, informants had to mobilize resources from several mechanisms to smooth consumption or escape the threat of ethnic violence. However, several of the mechanisms could not be accessed. For example, banks remained closed. Many ROSCA groups had also dismantled. There was thus a heavy reliance on the home bank, and M-PESA during the period. However, there were situations in which informants were solely reliant on M-PESA. One market seller explained:

When the violence started my husband ran away. I was left with the children. We had nowhere to go, and he left no cash...he took our home savings...They burned down the market so I could not work. I went to M-PESA and took my cash. I used some to buy some maize flour, water, sugar...I used the rest to pay for transport back home...When I returned home, I found him [husband] there.

[Laughs] He was shocked. He did not know how we found the money to return.

The market seller further explained that those who did not have access to savings had “suffered” through this period. Others “stayed hungry” until the violence subsided and they were able to find work.

Informants also spread out their savings amongst several mechanisms to avoid the risk of money being lost if one of them failed or could not be accessed. For example, Sylvesta kept money in both M-PESA and the bank. After he was paid his salary, he would withdraw a substantial amount from the bank and would deposit the money into his M-PESA account. Sylvesta explained that he did not fully trust the banks in Kenya with his money. He had heard “stories” that his savings would be lost if the bank crashed. He explained that such stories were especially prevalent during the post-election crises:

Sylvesta: Guys were telling me to take my money out of Equity [name of his bank]. They were sure that it was going down...Many had already taken their money out because they were scared. They were keeping the cash at home. I was scared to keep any of the cash at home...They were fighting and looting all over...So I took my cash and put it in M-PESA.

Interviewer: You weren't afraid that your money would be lost when saved with M-PESA?

S: No, only the banks are greedy for money.

Sylvesta was not alone in his distrust of banks. Many other informants confirmed this finding during the fieldwork. This distrust was especially common prior to the presidential elections of December 2007. There was a rumour circulating around Kibera that the head of Equity bank, who was Kikuyu like the President, was using the “common man's” money to fund the presidential campaign. Many were warned that Equity would soon crash. Informants took a variety of measures to protect their cash during the period. Some claimed that they took most, and sometimes all, of their savings from the banks and deposited the money into M-PESA and their home bank. They explained that they reduced the risk of money being lost by spreading out their savings.

The post-election violence also instigated another interesting trend in regards to savings behaviour. Numerous informants began to see the potential of M-PESA as an “emergency fund”, or a long term savings mechanism that could be used to address shocks. For example, a young gardener living in Kibera explained that he had not anticipated and thus not prepared for the post election violence. The outcome was a depletion of his asset base. He sold off

most of his furniture to purchase food and water. He also had to ask his rural relatives to sell his cattle send him the money. To avoid this from happening again, the young gardener began to accumulate cash savings via M-PESA. He called this his “emergency dough”, and set the target of depositing at least 200 Ksh every week. He explained that such cash would prepare him for several situations, from violence to illness to drought. The gardener also planned to open a bank account in the future. However, he explained that he could not do so until his income inflows became more stable.

This last example is interesting because it makes clear that a lack of savings can have negative implications on the asset base of the resource poor. In this case, the informant had to sell off some of his furniture and cattle to avoid going hungry. There were also informants that had to sell productive assets to push through the period. For example, a *mandazi* (donut) seller in Kibera explained that he sold his fryer to a friend after the post-election violence. He did not have any savings and had already accumulated a significant amount of debt with neighbours and relatives. According to Deveraux (1993) the liquidation of productive assets during shocks can have negative implications in the future. In particular, it makes poor households increasingly vulnerable to other events within their environment. Such vulnerability is lessened, however, if the resource poor have an accumulated base of savings to address the cash strains faced during unexpected events.

Having M-PESA as a savings mechanism also had other interesting outcomes. It made savers less dependent on others in the community during shocks. For example, those who were able to access cash via M-PESA during the post-election violence did not have to depend on city contacts or rural relations for their livelihoods. They were, at least partially, able to address the situation on their own. One informant in Kibera explained that her savings base in M-PESA allowed her to react more quickly to the violence. She did not have to “run around” and solicit loans from relatives or neighbours. She withdrew her cash from M-PESA and used it to travel back to her rural home. This provides another example of how a savings base can be used to increase the autonomy of the resource poor. In this case, the informant was able to react immediately to the situation instead of soliciting help from others. It can be argued that this increase in financial autonomy may eventually lead to a change in social relations and structures of reciprocity. If the argument is accepted that financial practices are socially embedded then it can also be argued that a change in the nature of transactions will lead to a change in social arrangements.

The findings presented here are a vital contribution to the branchless banking debate. Much of the work aggregates the term “financial services” and does not make clear that each service generates a unique set of outcomes. For example, when used for remittances the application facilitated an increase in the income inflows of rural dwellers. When used for savings, it helped urban migrants to smooth their household consumption and react to the shocks that emerged within their environment. These findings further substantiate the argument that the link between financial sector expansion and “development” is complex. This is because a different set of outcomes is generated by the use of each financial service.

Furthermore, many of the branchless banking studies focus on integrating the unbanked into the financial sector and formalizing practices. However, the above findings made clear that the major benefits are derived when financial mechanisms act as complements to others in the portfolio rather than as substitutes. This was made clear during the post-election. Informants had to tap into their informal savings mechanisms to get through the period because banks and other formal institutions could not be accessed. This finding makes clear that formal savings instruments, when used in isolation, cannot meet the needs of resource poor users.

We can also use these findings to take issue with the category of the “unbanked”. This thesis has shown that the resource poor are financially active even if they are not tapped into the formal financial sector. The financial diaries made clear the diversity of informal instruments held. This calls into question the actual benefits that will be derived from the formalization of these portfolios. Will an increase in the banked population really engender significant changes to the livelihood portfolios of poor users?

To better understand the benefits of financial inclusion the category of the unbanked should be disaggregated. Wyatt’s categories of non-usage can be useful in this process. For example, the fieldwork found evidence of financial sector *resistance*. That is, individuals not wanting to use the service even if it was available. Usually, such resistance occurred because the mechanism did not fit into their portfolio of savings mechanisms. *Rejection* and *expulsion* were also common. In regards to the former, some explained that financial institutions in general, and banks in particular, were too expensive. They made clear that the monthly fees would eventually wipe out their “small money”. In regards to the latter, some were “kicked out” from the bank because they could not maintain the minimum balance. Finally, some were *excluded* from usage because the financial service was not accessible. This was mainly the case in rural areas where there was an under-representation of formal financial institutions.

The majority of the branchless banking literature focuses on the last category, the excluded. Strategies of financial inclusion also target this segment as attention is being put on expanding the so-called access frontier. However, the previous section made clear that access is not a sufficient precondition for usage. There are a variety of reasons why individuals remain unbanked. Strategies of financial inclusion would be more successful if the particular needs and circumstances of the unbanked individuals were better understood. The literature should further note that financial inclusion strategies may also have their unintended consequences. When financial practices are formalized they also become more visible. For the governments of resource poor countries such visibility may have substantial benefits; it could provide new opportunities for taxation. This would put additional demands on the limited income of resource poor savers.

### ***6.43 New struggles over resources***

The previous section made clear that any larger scale transformation is driven and marked by struggles. One of the most important outcomes revealed in this thesis—that of rising incomes—was a product of these struggles. As was made clear in the previous section, the mobile phone was also implicated. Martin, the shoemaker, explained:

I bought her [wife] a phone so she could get cash directly. Now she is taking advantage. She is using the phone to hassle me for small money... She knows it is easy for me to send...If she needs money, or I am late, she will call...If I don't pick she keeps calling...If I don't send she gives me problems when I go back home.

Martin continued that these requests were causing tension between him and his wife. He had already threatened to take her phone away. He had also decreased the amount of airtime that he sent to her. Many of the urban men also complained of these increased requests. In response, many engaged in strategies of conservation to circumvent such requests and protect their limited income. Some would keep their phones off at certain points of the day whilst others denied they were M-PESA customers. In some cases, informants took more drastic measures and found ways to “punish” those making the requests. A barman in Kibera explained that he refused to send money when his wife called. “It is the only way that she will know her place”, he made clear.

Some urban men also took measures to ensure that their wives did not receive cash from other contacts. They did this by asking their rural relations to monitor the activity of the women. In particular, the men wanted to know if their wives visited the agent when they had not made a transfer. Some of the men also did not allow their wives to have mobile phones.

Instead, they sent the cash directly to one of their relatives and asked them to pass it on. This made it more difficult for the women to receive cash from other contacts. It also made it more difficult for them to call and “hassle” their husbands for cash. The women also took strategies of subversion to circumvent these restrictions. In some cases, they would have their contact send money directly to the M-PESA agent. They also asked friends in the village to receive cash on their behalf. These strategies of subversion also had their consequences. The women explained that if they were “found out”, their husbands would decrease the amount sent back home or stop sending cash for a period of time.

The previous section made clear that increased demands for cash were also coming from weak links. That is, distant kin and friends. Refusal to meet these requests also had consequences. For example, an office administrator working in Kibera explained that he “feared” going back to his rural home. About one month ago, his cousin called and asked for some money. However, the informant could not meet the request because it was nearly month-end and he was short on cash. This “angered” his cousin, who threatened to “bring problems” next time the informant returned to the village. The informant further continued that he did not have such problems before M-PESA was introduced because the cash was more difficult to transfer to the village. The refusal to send cash also had other consequences. That is, a decline of social resources. To avoid the numerous consequences associated with the decline, the migrants were very strategic when handling the requests. In many instances, they sent money to those who could be called upon for help in the future. As was made clear by one migrant, “if I help him [friend] today, then maybe he will help me tomorrow”.

This increase of weak link requests can also be an outcome of another trend. That is, the self help movement called *harambee* (Ngau, 1987). Translated into Kiswahili, this means “lets pull together”. This movement towards collective action has been encouraged by the government since independence to stimulate economic growth. A series of initiatives have been introduced under the *harambee* scheme. Some of these were of a formal nature and organized by the government whilst others were mobilized by community members themselves.

Many have argued that because of this movement a culture of philanthropy and altruism has emerged at the community level. They have further asserted that cultural understandings of obligation are also changing. This was somewhat confirmed during the fieldwork. In Kibera, *harambee* was prominent within the daily discourse. On several occasions, informants



sending cash outside of their immediate network explained that they did so in the “spirit” of *harambee*. They explained that it was important for “help out fellow Kenyans”, even if these Kenyans were not their “brothers and sisters” [of the same ethnic community]. To some degree, it can be argued that this collective movement was one of necessity rather than choice. The post-election violence put incredible strains on the incomes of the resource poor. For many, the only option was to seek assistance outside of their immediate networks. This example further makes clear the inter-relation of outcomes. The M-PESA application facilitated this movement of “pulling together” by extending the network of potential remitters and lenders. Many requested the cash under the guise of *harambee*. This finding is interesting because it provides another example of weak link amplification.

In some instances, increased usage also engendered tensions within the villages. This is because M-PESA made financial transactions more visible. For example, Gaudezina made clear that the women in her community were giving her “pressure”. Before M-PESA, people did not know that she had received cash. Her husband would have a visitor drop off the cash. In some cases, she would retrieve it from town. She explained that now it was easier for her neighbors to know that she had received a transfer. They could more easily observe her trips to the agents. Gaudezina continued that by the time she returned home, there was a mama (old woman) in the house asking for money. Gaudezina then laughed before explaining that M-PESA was not good for those who had debts. The debtors would be at the house to collect the cash, even before a withdrawal was made. Another trader also confirmed this finding. He explained that he would walk into Kakamega to retrieve cash sent via M-PESA. He had accumulated a significant amount of debt with his neighbors and preferred not to be seen collecting money. The trader also made clear that he asked his sons to increase the frequency of in-kind remittances. Such remittances could be sent directly to Bukura, and were less prone to demands from creditors.

Tensions also emerged when money was sent to other contacts on behalf of the recipient. As mentioned before, this occurred when the recipient did not have a mobile phone. For example, one elderly informant in Bukura explained that her son in Nairobi often sent money via M-PESA to her in-law. The in-law then passed on the money to her. However, she explained that the last transfer was made nearly one month ago but she had still not received the cash. When asked whether she questioned her in-law the woman shook her head. She explained that she did not want “trouble” with her family and was instead waiting for him to bring the money. She continued that she would ask her son to resolve the matter if the cash

was not returned by the end of the week. When the author met the woman again one month later she explained that the in-law had “eaten” the cash. He denied receiving any money and said that the transfer did not go through because there was a problem within the network. The women explained that she had asked her sister in law on several occasions to persuade him to give the cash back. However, he refused. The informant then asked her son to purchase her a phone to avoid these types of problems in the future.

The example of these tensions can also substantiate both the branchless banking and ICTD literature. It makes clear that there are clear limitations to the transformational potential of these applications. Some individuals were constrained from usage even when the application was available in the community. Others had access to the technology but could not exploit its full potential. These limitations should also be considered when financial inclusion and technology expansion strategies are cultivated. The findings also make clear that not everyone in the community benefited from the introduction of the application. Those who saw increases in their income inflows did not constitute the poorest segment of the population. The fieldwork also did not find a significant amount of evidence regarding the spillover effects of these increased income inflows on the community at large. This is apart from increased village activity, which will be described below. This finding is interesting because it substantiates the argument made by Mercer (2006). That is, ICT penetration does not benefit the most vulnerable segments of the population.

#### ***6.44 Reduced home visits***

There was another surprising outcome that emerged from increased usage. Many of the urban migrants decreased the number of home visits. They explained that before M-PESA was introduced, they would make the transfer by hand. They continued that they no longer needed to make this journey. Money could be sent directly to their wives through M-PESA. Martin, the shoemaker, explained:

Before, I went home every month to bring them [family] money...I don't have to do that now. I can send through M-PESA and save money on travel. This is good for my wife. I can send her more. It is good for business. I don't have to leave and can make more money.

In the village, the wives confirmed this finding. They further claimed that this arrangement caused some problems. Some of the women were concerned that their husbands would become “lonely” and find a “city wife” if they visited home less often. The women continued that this could have two possible outcomes. Firstly, it could result in the reduction

or elimination of money sent back home. It could also result in a co-wife inhabiting the rural land. The women also explained that they were left with a larger burden of the farm work when their husbands did not come home. In some cases, they had to hire additional farm hands as a result of the deficit. This put additional constraints on the rural household incomes.

This finding counters a popular assumption in the mobile technology literature—that these technologies amplify existing relationships. When used as tools for financial services, these technologies can have the opposite effect. It is likely that if urban migrants continue to decrease the physical contact with their wives, their marital relationship will be weakened as a result. This provides another interesting example of the contradictory effects of a technology. The same technology can be used to amplify, and dilute, strong link relations.

It can be argued that the decreased number of home visits were also the result of inflation as well as recurring riots. In regards to the former, many of the informants made clear that the prices of bus tickets to their rural homes had gone up significantly since the post-election violence. In some cases, the prices had nearly doubled. Employment was also unstable during this period. As a result, some informants could not afford to make the trip back home. This could also explain why the frequency of remittance transfers increased. As was the case with calls, the transfers provided a compromise for the deficit created by distance. During the period of political instability and inflation they functioned as substitutes for home visits. Additional research is required to determine whether this trend will continue in the future. This finding also makes clear the inter-relation of outcomes. In this case, the events of the post-election violence led to decreased home visits. It also led to increased remittance transfers.

#### ***6.45 M-PESA and structures of dependency***

The previous chapter made clear that urban migrants were using M-PESA to maintain relations with their rural relatives. This finding raises interesting questions regarding the structures of urban-rural dependency within Kenya. In particular, is the application being used to challenge or reinforce these structures? As was made clear in chapter 2, the country is marked by significant inequality. This is particularly between urban centres like Nairobi and rural areas like Bukura. Not only wealth, but job opportunities are concentrated in urban areas. It can be argued that M-PESA is a tool for the reinforcement of these dependencies because it fosters the money flows that are vitally important for rural livelihoods. This could

have negative consequences for rural economic activity, which is likely to be lower if such dependencies continue. It can further have negative implications on the nature of gender relations within the household. It can be argued that such relations will be imbalanced for as long as women depend heavily on remittances for their livelihoods.

In some ways, the application is also having the opposite effect. As was made clear in the previous section, many rural women are using M-PESA to circumvent restrictions within the household and receive cash from other contacts. How this will impact urban-to-rural relations in the longer run needs further investigation. What is vital to recognize at this point is that M-PESA is helping rural users to function better within the existing structures of power and dependency.

This also raises some interesting questions regarding the redistribution of wealth within Kenya. One of the greatest features of M-PESA is its ability to facilitate the release of money flows across the country. Because of the extensive agent network, cash is penetrating areas that are not so easily reached with the other channels. This has, to some degree, changed the urban-rural wealth distribution. As was mentioned before, rural household income has increased since users started receiving money via M-PESA. This has been at the expense of urban dwellers who are receiving additional demands for money. Such redistribution of wealth could be evidence of an impact starting to materialize. More specifically, the structure of urban-rural dependencies may be changing. There was evidence of such a shift during the fieldwork. It was observed that some of the rural recipients used the extra cash received via M-PESA for productive purposes. For example, one of the rural dairy holders called Elizabeth used the money to purchase material to make her table cloths. She also used the cash for transport, as she travelled around markets in Western Kenya selling her product. Another rural informant had used the extra cash received from his brother to purchase a new tire for his bike. This allowed him to resume his *boda boda* business and increase his income for the month. If rural household income inflows continue to rise then recipients may have additional cash to invest in productive activity. This could increase their personal incomes and make them less dependent on remittances for their livelihoods. It could also result in an increase in rural economic activity. It must be noted that the money was not always used in productive ways. As was mentioned previously, some utilized the extra cash to smooth their income during a period of rising inflation.

An increase in economic activity at the village level was also observed. Before M-PESA was introduced, many of the rural dwellers would travel to the nearest town to get their cash. In some cases, they would spend a portion of the amount received to purchase household items in town. However, M-PESA allowed the recipients to receive money in the village. This decreased the amount of visits that the rural dwellers made into town. It also increased the amount of money that they spent locally. Three shop-keepers were interviewed and all said that they were receiving more customers since M-PESA was introduced into Bukura. The market sellers within the village centre also noted more activity. One market seller, who sold a variety of household items such as stools and radios, explained that she was receiving an increased demand for “city goods”. Because the rural dwellers were making less frequent trips into town they wanted to purchase more of the items at the village market. This provides an example of the inter-relationship between the outcomes. In this case, increased usage resulted in more economic activity in the village. This is likely to have positive implications for the income inflows of the shop-keepers and market sellers. Such a change may also cause a shift in local markets. An increase in city goods over time was also observed. This is likely to continue if local demand persists. There may also be new opportunities for rural, non-farm earnings at the village level. More market sellers, shop-keepers and traders will likely be needed to meet the rising demands for goods at the village level. The various outcomes that emerge from this trend require further investigation.

### ***6.5 Examining other outcomes and Impacts***

The majority of this thesis has been focused on the outcomes that occurred in the daily lives of the user. It must also be noted that impacts are starting to emerge not just in Kenya but also other communities. To make clear these impacts, a conceptual framework provided by Sein and Harindranath (2004) will be used. According to the authors, the impact of ICTs can be classified under three different categories. The first order effect includes substitution of the old technology for the new. The evidence of such substitution is usually in the customer growth figures. In the case of M-PESA, the application did not substitute another ICT. However, it did provide a substitute for other money transfer channels. The second order effects include an increase in the phenomenon enabled by the technology. More calls to strong links provide one example of a second order effect. A rise in the frequency of transfers is another.

The third order, or tertiary effects, includes changes that occur at the macro level because of increased penetration (primary order effect) and increased usage (secondary order effect).

Such changes come in a variety of forms. This includes the creation of new technology related business, or the cultivation of new regulatory regimes to support the developing technology. The next section will describe two tertiary effects—the introduction of new mobile money products in Kenya and the emergence of a new industry for mobile money internationally. Such a discussion is vitally important because it reveals the interdependency of outcomes. It also makes clear the impacts that emerge after a technology becomes more pervasive in a community.

### ***6.51 The introduction of new mobile money products***

The rapid growth of M-PESA led to the development of other mobile money systems in the market. In July of 2007 Celtel, which is now Zain, also launched a mobile money transfer service called Sokotele. There was some variation to the service offering provided by Sokotele. Unlike M-PESA, the application was not SIM based and did not reside on the mobile phone. As a result, the customer had to visit the agent to conduct the transaction. This design had serious limitations in regards to scalability and Sokotele was shut down. It was rebranded as Zap Money and re-launched in February of 2009 after Zain took over Celtel. This time, a SIM based approach to design was taken. This means that, as with M-PESA, users can initiate and conduct the transactions via their mobile phones. To compete with M-PESA, which already had 5.8 million users when Zap was introduced, Zain developed a unique value proposition. The system was introduced as a mobile wallet solution, rather than a money transfer service. It was also designed with a unique fee structure. Unlike M-PESA, the cash in/out fees are recommended rather than set. This allows the customer to negotiate transaction fees with individual retail agents. If, and how, such flexibility will be valued by customers is yet to be seen.

Zain has not released recent figures on the growth of the Zap customer base. Three months after launch, they noted that 200,000 customers had signed up with the service. They further reported their agent base to be above 3000. There are plans to sign-up more customers with the service, with the goal of retaining 35%-40% of the existing customer base within the first year. Zain also notes that its competitive advantage will be with cross-border remittances. The MNO has a presence in 12 countries across Africa and a customer base of 400 million within these countries. In June of 2009 they also partnered with Western Union to enable money transfers between countries on the Zap platform. There are also reports that Orange, the third MO, is also planning to roll out a service. How they will position themselves in an already saturated market is yet to be seen.

These mobile money systems are being developed by MNOs, and are part of strategies for customer acquisition and retention. Recent research has revealed that such strategies are successful. For example, the GSMA (2009) found that mobile money products can increase average revenue per user (ARPU) by up to 74%. Mobile money customers are also more loyal to the operator. It is reported that in the Philippines 68% of mobile money SIMs are used as the primary SIMs. In Kenya's increasingly competitive environment such customer loyalty schemes are important. It can thus be expected that the mobile money market to become just as competitive as that of mobile telephony.

Chapter 3 made clear that the introduction of M-PESA led to the development of other mobile money products within the Kenyan market. These products were introduced as part of the customer acquisition and retention strategies of MOs. But it was not just MOs that saw the potential of these types of services. Banks also responded to the rapid growth and began to develop their own mobile money services. In September of 2008 Equity Bank, which is Kenya's largest bank, launched a service called "Benki Yangu Mkononi". This service allows the existing customer base to use their mobile phones to conduct a variety of transactions. Other banks also followed suit and introduced their own services. This includes Co-operative, Standard Chartered, KCB Bank, Post Bank, Consolidated Bank and Barclays. Most of these services allow customers to check account balances, transfer funds between accounts, pay utility bills and order check books and statements. These services facilitate person to person money transfers but only if they are done between accounts. Based on the service offering, it can be argued that the banks are not likely to erode the customer base of MOs. However, the opposite may be true to some extent. As was shown in the empirical findings, many are using M-PESA to manage their finances as the service is cheaper and more accessible than other financial institutions.

This finding illustrates a vitally important tertiary effect. The rapid growth of M-PESA led many in the banking industry in Kenya to consider the mobile phone as a valuable mechanism for the delivery of their services. Such a change will likely impact the ways in which many Kenyans interact with financial institutions. It may also change their daily financial practices. For example, it can be argued that m-banking users will check their balances more often because it is easier for them to do so. This finding provides another example of the interdependency of outcomes. If changing practices lead to outcomes then it is likely that many more of such outcomes will emerge with the introduction of new mobile money products.

## **6.52 The growth of a new industry for mobile money**

The rapid growth of M-PESA has led to another interesting impact—the development of a new industry for mobile money. It has been estimated that over 120 mobile money products will be in the market by the end of 2009 (GSMA, 2009). There were just a few of these products operational when M-PESA was introduced. Like M-PESA, many of these services target the unbanked and prepaid segment of the population. This new industry is constituted by a diverse set of participants including development practitioners, handset and application developers as well as bankers and mobile service providers.

Although banks are also entering this space, it is the MOs that are driving it. In fact, the GSMA (2009) predicts that mobile money is becoming a mainstream business for these operators. This is not surprising. As mentioned above, the research shows that average revenue per user (ARPU) is higher with these mobile money products. Mobile money users are also more loyal to their operators. However, there are some concerns within the industry regarding the profitability of such products. Especially since M-PESA is one of the only systems to have seen such rapid growth. Similar applications have been introduced in other parts of the continent, albeit none of these have been as successful. For example, South Africa's Wizzit has managed to attract 250,000 customers. This is after being in operation for over four years. Neighbouring Tanzania also has its own version of M-PESA. However, subscription rates are lower than in Kenya. Since its launch in April of 2008, over 100,000 customers have signed up with the service.

These mobile money systems are taking a variety of forms. This is mainly because they are constituted by a divergent set of partners. In some cases, these partnerships are being formed between institutions that have had very little contact in the past. In particular, many MOs are beginning to work with financial institutions. For MOs, such partnerships are beneficial. They provide access to the existing customer base of the banks. In some countries, MOs cannot operate without banks because of regulatory stipulations. For banks, such partnerships make it easier to reach their existing customer base and lower operational costs. New partnerships are also being formed between MOs and social networking sites. For example, Globe Telecom in the Philippines has partnered with Friendster (social networking site) to offer virtual person-to-person payments via the site. Obopay, a US based payments service, has also partnered with Facebook to offer a similar service. Such partnerships allow the mobile service provider to go beyond person-to-person transfers and offer a variety of financial services. Table 15 lists some of these partnerships.



<b>Name of Service</b>	<b>Country</b>	<b>Year Introduced</b>	<b>Partners</b>
Wing	Cambodia	2008	- ANZ (bank) - Vision Fund (MFI) - Hello (mobile operator)
M-Paisa	Afghanistan	2008	- Vodafone (mobile operator) - Roshan (mobile operator) - First Microfinance Bank (MFI) - FINCA (MFI)
Orange money	Senegal	2008	- Sonatel (mobile operator) - BICIS (Bank)
Zap	Uganda, Tanzania, Kenya	2008, 2009	- Zain (mobile operator) - Citigroup (bank) - Standard Charter (bank) - Western Union (money transfer service)
CelPay	Democratic Republic of Congo	2009	- CelPay (mobile operator) - Fundamo (financial services platform provider)
MobiCash	Morocco	2010	- Attijariwafa Bank - Banque Populaire - Comviva (financial services platform provider)
Mobile Money	Rwanda	2009	- MTN (mobile operator) - Fundamo
Mobile Money	Uganda	2008	- MTN - Stanbic (bank) - Fundamo
Easypaisa	Pakistan	2009	- Tameer Microfinance Bank - Fundamo
Etisalat	India	2008	- HSBC India (bank) - Citibank - Mashreqbank UAE
Tigo	Paraguay	2008	- Vision Banco - Banco Continental - Unibanco - USSD2 (IVR platform)
Maxis	Malaysia	2007	- MayBank - HSBC - Utiba (technology services platform provider) - USSD2

**Table 14: Mobile Money Partnerships**

Such industry growth has been led by several key players. The first are the trade associations. A good example is the GSMA, which is an association composed of over 800 operators and 200 related companies around the globe. Not long after M-PESA was introduced, this organization started to disseminate information about its rapid growth. This occurred through industry publications. It also occurred through conferences. In early 2009, the association went one step further and set up a dedicated mobile money unit. The aim of this unit is to work with MOs, banks and other financial institutions to expand the reach of affordable financial services.

Donors are also driving such growth. For example, in 2007 the Bill & Melinda Gates Foundation gave \$24 million to CGAP, a consortium of development agencies that works to expand financial access. Two years later, \$12.5 million was given to the GSMA for their Mobile Money for the Unbanked (MMU) initiative. Both grants support pilot projects that use technology to expand the reach of financial services.

The growth of the industry illustrates that tertiary effects, or impact, can extend beyond the environment in which the application was developed and introduced. It also shows that these effects cannot be conceptualized in a linear manner. In this case, the growth of the mobile money industry has resulted in the introduction of new mobile money services. This will lead to new primary and secondary effects as these services become increasingly adopted and used in other contexts.

## ***6.6 The importance of public-private partnerships***

The findings presented here can also be used to contribute to another important debate. That is, the role of public-private linkages in the developmental process (Hanna, 2003; Henderson & McGloin, 2004; Unwin, 2005; 2009). Several studies have argued that such partnerships are vital for the growth of both the ICT and financial sector in Southern countries. These studies further make clear that such growth will have a vital role in improving livelihoods and reducing poverty. In the context of ICTD, these strategies have taken a variety of forms. In some cases, external private corporations have worked with local public organizations to implement a project. The OLPC project introduced by MIT Media Lab is one example. In other cases, external public organizations have worked with local firms. This was the case with M-PESA. As was made clear in Chapter 2, the initial funding for the development of the application was provided by DFID. This same amount was then matched by Vodafone.

This funding was vitally important to the development of M-PESA. Numerous informants at DFID and Vodafone made clear that the application would not have passed through the stage of conceptualization without this initial investment. However, the donors did have some reservations about handing over the cash. They needed to justify providing funding to one of the world's largest telecommunications company. Despite internal debates regarding the efficacy of this type of donation, DFID decided to give Vodafone the £1 million. This decision proved to be a good one. This chapter has illustrated the numerous livelihood improvements engendered through usage. It also made clear that such improvements were generated because M-PESA facilitated the solicitation of capital from a wide network of lenders and remitters. It can be argued that such a network could not have grown as effectively if large MOs like Vodafone and Safaricom were not behind this project.

The example of M-PESA makes clear another vital role for funding bodies in PPP. That is, to help move corporate social responsibility (CSR) projects with potential for livelihood improvement beyond the stage of initial conceptualization. Working with large corporations on such projects can be advantageous for the donor, especially if the private organization has access to a large market in a resource poor country. Such interventions have a greater chance of engendering livelihood improvements if services are offered at scale. These interventions also have a greater chance of being sustainable, especially if they are generating revenue. Such sustainability is important for livelihood improvements in the future. The OMF's spheres of influence can also be applied to explain successful PPP. In this case, DFID relinquished control of the project at an early stage of development. This gave Vodafone the flexibility to move away from the initial project concept and to create a value proposition that was more suitable to the context. The result was the rapid growth of M-PESA.

## ***6.7 Conclusion***

The empirical evidence provided in this chapter substantiates the final argument of this thesis—that increased usage engendered outcomes in the daily lives of the user. The chapter distinguished these outcomes in several ways. First, it separated the remittance and savings usages outcomes. It made clear that the former was generated by a network effect. That is, as the customer base grew the value of M-PESA as a lender/remitter network expanded. Many rural users exploited this vast network to increase their income inflows. In regards to savings, the majority of outcomes were facilitated by the accumulation and preservation of

cash. This cash was vitally important for consumption smoothing. It helped the resource poor to adjust to, and prepare for, future shocks.

The chapter further separated mobile phone outcomes. It made clear that outcomes engendered when the mobile was being used for communication were different than when it was being used for financial services. In fact, the findings presented contradictory effects. For example, when used for communication the technology strengthened strong link relations. This is because calls provided a compromise for the deficit created by absence. This was also the case, to some degree, when used for financial services. Each transfer had a vital symbolic function. It reaffirmed the migrant's commitment to his rural home. Such reaffirmation was vital to the maintenance of urban-rural linkages. The empirical findings also revealed that increase usage also had the opposite outcome. Many informants made clear that they decreased their home visits since adopting the application. The analysis explained that such a decrease may have been circumstantial. The post-election violence, combined with the subsequent rising inflation, could have deterred some from making the trip. More research is needed to determine whether this trend will continue in the future. The implications of such a trend would also be interesting to examine.

The analysis has also made clear that not all of the outcomes engendered by usage are positive. For example, the rural women were left with a greater share of the farm work because their husbands were visiting home less often. They were also under constant threat of a "city wife" appearing. Urban migrants were also implicated into struggles over their limited resources. In some cases, they offended their relations by denying requests for money. In others they met these requests, but their income decreased as a result. Such consequences provide an interesting example of what Edward Tenner (1996) calls the "revenge effects" of a technology. He notes that our increase of domination over things has been matched by the hostility of the things arrayed against us. However, he makes clear that technology alone does not produce a revenge effect. It is only when these technologies are anchored into our laws and regulations, customs and habits, that the irony reaches its full potential. This chapter has provided some of the unintended consequences that emerged from the usage of mobile money. The examination of the application in other contexts is likely to reveal many more.

Tenner also discussed a phenomenon he called "reverse revenge effects". He noted that unexpected benefits can emerge from a technology when it is adopted for another reason, or

used in unforeseen ways. This is what happened when M-PESA was used for savings. By integrating the application into their financial portfolios, and using it for the accumulation of assets, the resource poor were reducing their vulnerability to unexpected events. They were also increasing their financial autonomy within the multi-spatial household. According to Tenner, these reverse effects are interesting to monitor. This is mainly because they provide examples of the benefits derived from the complexity of the world's mechanisms. It can be argued that these benefits will be missed by development practitioners who look for specific transformations that lead to "ideal" forms of social and economic order.

We can conclude this final chapter by asking an interesting question. Do the outcomes presented here provide evidence of a larger scale transformation that is looming? It can be argued that increased usage may substantially alter the structure of urban-rural dependencies. More specifically, rural dwellers could become less dependent on their close relatives in the city for cash. They will instead seek cash from a wider network of city contacts. This is more likely to happen if the migrants continue to decrease their home visits. Such decreased dependency will provide rural dwellers with more financial autonomy. This could lead to a rise in economic activity within rural areas, especially if the additional cash is used in productive ways. It could also have positive spill-over effects on the community. More economic activity could lead to additional opportunities for non-farm based work. This would eventually change the structure of livelihood portfolios with villagers becoming less dependent on remittances for their livelihoods.

Changes to structures of dependency could engender negative outcomes for the urban migrants. This segment may spend more time in the city if they continue to decrease contact with their rural homes. This could lead to overcrowding in densely populated informal settlements. It could further lead to more competition for already scarce employment. If rural economic activity increases, the opposite may also occur. Migrants could return to their natal village to exploit economic opportunities. Rural to urban migration may also decrease as individuals find employment locally. These are just some of the numerous scenarios that may occur once the outcomes start to accumulate. Although unlikely to result in cultural degradation, some larger societal changes are likely to emerge as M-PESA becomes anchored in the daily lives of Kenyans.

The chapter also put some attention on impacts. For example, it revealed that the rapid growth of M-PESA has led to the development of an industry for mobile money. Such an

industry is constituted by a diverse set of players, from banks to MOs and handset suppliers. It is also constituted by a diverse set of mobile money ecosystems. The growth of this industry reveals that the effects of a system can emerge outside of its environment. This raises another interesting question—how far will these outcomes and impacts extend?

A story told by Geertz (1973, pp. 28-29) of a curious Englishman can provide some insight. The Englishman was told that the world rested on a platform, which rested on the back of an elephant, which rested on the back of a turtle. When asked what the turtle rested on an interesting response was given—“Ah Sahib, after that it is turtles all the way down”. Once a system grows widely in a community, and becomes entrenched in the practices of daily life, its effects become increasingly widespread and much more difficult to both trace and measure.

## **Chapter 7: Conclusion**

### ***7.0 Explaining growth***

This thesis has presented an in-depth analysis of customer adoption, usage and outcomes. It has been focused around two central research questions. The first was inspired by the rapid growth of M-PESA. As was made clear in the introduction, the application captured 7.5 million users or 34% of the adult population in just over two years. Over 90% of this base is reported to be active. Such rates are impressive because they have even exceeded the mobile phone, which has been hailed as the fastest growing ICT in the South. It took MOs over a decade to reach the 16 million customer mark in Kenya. The rapid growth of M-PESA is also interesting to investigate because it provides a rare case of an ICT growing rapidly in the South and “failing” in the North. As a result, the first question asked why M-PESA grew so rapidly in Kenya.

Such a question was contextualized within a broader enquiry of why some ICTs grow in the South whilst others fail. A review of literature revealed a variety of reasons for growth. For example, several authors pointed to the inefficiencies in the ICT sector as major barriers of growth (Calderon & Serven, 2008; Liebowitz & Margolis, 1994; Saloner & Shepard, 1995). They made clear that rural areas are largely under-served and that services within urban areas are poor. Some blamed policy-makers and regulators for such inefficiencies and argued that a permissive regulatory environment would stimulate the growth process (Cohen & Southwood, 2004). Some also focused on getting the price right and made clear that the mobile phone grew rapidly because mobile operators designed pricing schemes to suit the erratic incomes of the resource poor (Horst & Miller, 2006).

Demand side factors have also been cited as major drivers of growth. For example, Horst & Miller (2006) argued that the mobile grew rapidly because it fit into the needs, interests and habits of resource poor Jamaicans. It was central to strategies of resource accumulation, which facilitated the day to day survival of the users. A need for sociability has also been cited as a reason for growth. Numerous authors have argued that these technologies have been adopted widely because they save the resource poor both time and money on the maintenance of relations (Donner, 2005; Hahn & Kibora, 2008; Horst & Miller, 2006; Horst, 2006).

These various explanations raise an interesting question, which of these factors can best explain the rapid growth of ICTs in general, and M-PESA in particular? The thesis started from the premise that technological growth is both complex and contingent. As such, it is difficult to identify a few factors to explain this process. The analysis also integrated these various explanations and presented growth from two perspectives—the systemic and the user. In regards to the former, Hughes' (1986;1990;2005) socio-technical systems framework was used to make clear that M-PESA was not just an application; rather, it was a complex system constituted by a number of inter-related elements. The system maintained its stability because the elements were complementary. For example, the agent commission structure facilitated the expansion of both the agent network and customer base. Such a structure rewarded the acquisition of new customers. Agents were given a flat rate for each customer signed up, which maintained their revenue flows for the earlier stages of adoption.

The pricing structure further provided an incentive for them to expand the customer base. Many agents went from village to village promoting the service. The commission structure also provided incentives after the customer base grew. Agents were paid a commission on each cash-in/cash-out transaction performed. As a result, they took numerous measures to increase the transactions such as promoting unintended usages like savings.

The customer pricing structure was also a vital element in the system. The empirical evidence suggested that many urban migrants adopted M-PESA because the per transaction transfer fee was significantly lower than the other money transfer channels. They further convinced their rural relatives to also sign up with the application because the fee structure was set so that it was cheaper to send money to a registered user. This aspect of the pricing scheme is particularly interesting as it resulted in the enrolment of technology laggards, or late adopters of the technology (Rogers, 1995; 2002; Kautz & Larsen, 2000). It further made it easier for the M-PESA to penetrate rural areas, which are under-served by financial institutions.

The thesis also explained growth by contextualizing the M-PESA system with others in the environment. It made clear that M-PESA grew quickly because it was subsumed under the Safaricom mobile phone system. Such a system was massively extensive and had penetrated 79% of the entire market share in Kenya. It thus provided an appropriate platform for the rapid expansion of the service. The Safaricom system had also established trust relations with the customers. This was vitally important for the initial adoption of M-PESA. The



empirical findings revealed that many of the customers did not initially trust the agents. However, they continued to use M-PESA because they trusted the Safaricom brand. The mobile operator was the first in Kenya to offer affordable pre-paid services to low-income clients and was seen a provider for the “common man” by Kenyans. The operator also put made an effort to establish an emotional connection with customers by presenting themselves as distinctly Kenyan.

Being subsumed under the Safaricom system, however, was not without its drawbacks. Problems experienced with the Safaricom network also impacted M-PESA. For example, money could not be accessed or sent when the network went down. This caused a small portion of users to revert to their previous methods of money transfer.

The thesis also emphasized that factors in the system’s environment shaped the trajectory of growth. A good example is the regulators. The CBK allowed M-PESA to be piloted and introduced into the market. They did this even though they had very little experience with this type of application and no regulatory framework under which to classify M-PESA. Rather than impeding growth because of this gap, the CBK took a very different approach—they adapted the regulatory environment to suit the innovation. The National Payments Bill (NPS), which puts M-PESA and similar financial services under the jurisdiction of the CBK, is expected to pass within the next few months (CBK, 2008b).

In 2010, the CBK also issued new agent banking regulations that allowed banks to outsource their cash in and cash out transactions and product promotion and customer registration to retail outlets. This has allowed mobile operators to partner more closely with banks to introduce savings products. Not long after the regulation was passed, Safaricom and Equity introduced M-Kehso, a co-branded savings account that runs on the M-PESA transactional rails (Mas, 2010). It allows customers to sign up remotely at select agent locations for the account and transact via local agents. Orange also introduced a savings product in conjunction with Equity called Iko Pesa.

CBK’s decision to facilitate the growth of mobile money reveals an interesting change in approach. The thesis provided several cases of ICT growth being stifled by regulators who focused on immediate gains rather than service expansion and sustainability. In this case, M-PESA was seen as vitally important to strategies for financial inclusion. This is why the

CBK took the risk of promoting the service. Such a permissive environment has allowed Kenya to be one of the fastest growing markets for mobile financial services in the world.

The analysis also identified some key systems engineers. These individuals took a variety of strategies to expand and maintain the stability of the system. On the ground, the agents worked to register customers and explain the various features on M-PESA. Local experts also showed new users how the application worked and both classes of intermediaries promoted unintended usages such as savings. These intermediaries were also vital to customer growth because they were able to gauge the users' needs and suggest particular ways that the technology could be used. This is especially if they had a pre-existing relationship with the agent, which was often the case in the rural sites.

There were other system engineers that facilitated technological growth. This includes Vodafone executive Nick Hughes, who managed to solicit cash from DFID for the initial development of the project. It also includes Michael Joseph from Safaricom who backed the launch of the system even though he had initial reservations about its success. Without the efforts put in by these engineers, the application would not have grown as quickly. In fact, it may not have been introduced at all.

The various reverse salients that impeded growth and threatened the stability of the system were also discussed. For example, it made clear that the commercial banks in Kenya reacted negatively to the fact that M-PESA was not regulated. In fact, they tried to persuade the CBK to "freeze" the system. The system engineers had taken a variety of measures to protect the service against hostile external forces. They enrolled the CBK into the system at an early stage of development and also enrolled the Financial Services Authority (FSA), which had a pre-existing relationship with the CBK. With such measures, they protected the system against degradation.

Through the appropriation of the socio-technical systems framework, the thesis noted several supply side factors contributing to growth—from pricing schemes to mobile phone handsets. The importance of demand side factors was also made clear in the analysis. It was argued that M-PESA was adopted because it fit into social practices that predated the application. This includes money transfers back home; it also includes savings. The thesis further made clear that money transfer practices were maintained because they had both a practical and symbolic function. In regards to the former, they were a vital source of livelihoods for the

rural dwellers. Because of the uneven structure of the economy, it was difficult for many villagers to find non-farm income sources. As a result, remittances constituted a substantial portion of their income inflows. In some cases, nearly 70% of rural household inflows came from remittances.

M-PESA was also implicated in the livelihood strategies of the villagers during which actors would convert and reconvert resources (social, symbolic, economic) to maintain or improve their position within the household. This allowed them to react to, and cope with, unexpected events that emerged within their environments. These strategies took two forms, those of conservation and subversion. Urban migrants would engage in strategies of conservation to maintain their dominant position. When sending money home via M-PESA they would convert their economic capital (cash sent back home) for the social and symbolic. The social and symbolic capital helped them to maintain power within the multi-spatial household and allowed them to make claims for other assets, such as material goods and cash. The villagers engaged in strategies of subversion and used M-PESA to amass economic capital from other contacts with the end goal of having more autonomy to make decisions within the multi-spatial household.

The work made clear that such struggles were a zero-sum game—someone had to lose for another to gain. This was certainly the case within the two sites, where economic resources were scarce. Urban migrants made clear that since adopting M-PESA, their cash reserves had decreased. They were receiving requests from relatives who they could not “deny”, or these relatives who had amassed symbolic capital throughout their lifetime. In some cases, these relatives had not made requests for cash in the past either because it was more difficult to get hold of the migrant in the city or because the cost of the transfer was too expensive.

The thesis also pointed to some unique events in Kenya that facilitated the growth of the application. The most significant was the post-election violence. Many began to see the value of M-PESA during this period because it facilitated the transfer of cash in electronic, rather than physical form. This allowed the application to circumvent the constraints on the physical transfer of cash. The recurrent shocks following the violence also put additional constraints on the limited incomes of both the urban migrants and their rural relatives. As a result, both user groups had to exploit their multi-spatial livelihoods and mobilize resources from other contexts. M-PESA, because of its accessibility and low cost, became the ideal tool for such mobilization.

## ***7.1 Discussing outcomes and impact***

The discussion of adoption was vitally important because it set the context for the second research question. This examined the outcomes that emerged when M-PESA was integrated into the daily lives of the user. Such an analysis revealed several interesting findings, such as changing practices. Urban migrants began to send money home more frequently, which benefited the recipients. By receiving money transfers via M-PESA villagers were able to react to situations, such as stock deficiency within the household or illness, with more immediacy.

The application also facilitated consumption smoothing when used for savings. Through the diversification of their savings portfolios, the resource poor were decreasing the risk of their savings being inaccessible if one of the other mechanisms failed. The importance of diversification was made clear during situations like the post-election violence. Many relied on cash stored with M-PESA to “push through” the period when banks remained closed and their home savings were depleted.

The change in practices also resulted in another interesting outcome. Many of the rural dwellers made clear that their income levels increased since they started to use M-PESA. In most cases, such an increase was between 5-30% of rural household income. This increase occurred because M-PESA reduced the costs associated with the entire money transfer process. Money could be sent from anywhere, and at anytime, as long as there was a balance in the account. This meant that senders did not need to pay additional fees such as transport to make the transfer. The recipients also saved on transport costs. They could retrieve the cash from within the village centre instead of travelling to the nearest town.

Incomes also increased because the application generated a network effect. Users exploited the wide network of lenders and remitters that was tapped into M-PESA to solicit “small money”. The result was an increase in their total income inflows. However, as mentioned above, resource accumulation was a zero-sum game. This meant that the urban migrants income had to decrease to some extent for the rural dwellers to gain. The empirical findings further made clear that not all outcomes were positive. For example, many of the urban migrants decreased the number of visits made back to their rural homes after adopting M-PESA. This was a source of anxiety for some of the rural women who worried that their husbands would become lonely and find a city wife. Urban users were also implicated in

additional struggles over their limited resources. They had to cultivate strategies to manage these requests whilst not depleting their social capital base.

Within the discussion, external factors that may have also contributed to the outcome were identified. For example, inflation rates were high in Bukura following the post-election violence. As a result, rural dwellers had to increase their requests for money to smooth out their consumption. The higher cash inflows thus did not always increase the purchasing power of the rural recipients. High rates of inflation also contributed to the decreased home visits, and increased money transfers. The price of bus tickets home had risen, and in some cases doubled, after the post-election period. The work of many urban migrants had also been interrupted as a result of the recurrent violence. Many urban informants explained that it was too expensive to go back home. To make up for the deficit caused by distance and express their loyalty to their natal villages, they continued to send money back home.

The analysis further discussed impact or tertiary effects. These emerged as the user base expanded, and transaction rates intensified. For example, many of the banks in Kenya reacted to the success of M-PESA by introducing their own mobile money applications. MOs in other countries also saw the potential benefits of this type of service to customer retention strategies. As a result, an industry for mobile money developed. Such an industry was marked by a diverse set of partnerships between MOs and financial institutions and even social networking sites. These effects make clear that mobile financial applications can engender outcomes outside of the environments in which they are developed.

The role of donors and local partners was also integrated into the discussion on outcomes. It was made clear that as outcomes started to emerge the influence of donors decreased, whilst that of the local partners increased. It was also made clear that local ownership had to be dominant before outcomes were realized. Outcomes started to generate after numerous categories of Kenyans—from Safaricom employees, to agents and users—decided to integrate M-PESA into their daily lives. The discussion also emphasized that donors played an important role at the earliest stages of development. It would have been difficult for Vodafone to move M-PESA past the conceptualization stage without the financial support and contacts provided by DFID. It was also made clear that the donors are presented with an interesting paradox when assessing the impact of their interventions. The impacts usually start to materialize when their influence is lowest, if they are successful in their efforts. These impacts are not only shaped by the intervention but also numerous other factors and

events in the environment. These are often difficult to identify for donors who are dislocated from, and often not that familiar with, the environment.

## ***7.2 Research choices and outcomes***

It must be noted that the findings presented above emerged from a series of choices that were made during the research process. Many of the choices were also shaped by the choice of context and interactions in the field. For example, the researcher was led to a very specific sample of informants because of her association with Richard, her research assistant. Many of these informants were within Richard's social network. The majority were Luhya and came from villages around Butere-Mumias district. The post-election violence also increased tensions between different ethnic communities within Kibera. This made it difficult for Richard to interact with Kikuyu or Meru informants.

Such interactions could have yielded very different results in regards to the frequency or purpose of money transfer. For example, the majority of Kikuyu migrated from villages in central province and were able to reach their natal homes within a few hours. Because of such proximity, it is less likely that Kikuyu M-PESA users would have decreased their home visits to the same extent as the Luhya. They may have also been more likely to carry the cash by hand when making the visit, which means that the number of cash transfers would have most likely been lower amongst this segment.

Furthermore, individuals within Richard's social network in Kibera also tended to be male and in their mid to late twenties. The research thus captured the transaction patterns of this segment. It is also likely that the number of monthly transactions would have been lower if more women were incorporated into the study. As mentioned in the empirical findings, females were associated with the home rather than workplace. The obligation to provide support to the relatives in their natal home was not as strong. The interaction with Richard also shaped which "money trail" was followed. But there were numerous networks of home people within Kibera. If interaction within these networks was increased, the trail of money would have likely led the researcher to a very different location.

The decision to focus on urban users with rural connections also led to a very specific set of research findings. It is likely that individuals without such connections could have made a lower number of monthly transfers. They would have also made such transfers within Nairobi or to other urban centres such as Mombasa. The empirical work also revealed that

numerous individuals were using M-PESA for business purposes. For example, traders in Kibera often used the application to pay their suppliers in town whilst police officers on the periphery of the informal settlement used it to collect bribes. An examination of such usages would have revealed not only a different set of transaction patterns but also volumes. The choice to track particular users over time allowed the researcher to have a closer relationship with informants and deeper insight into their daily lives. This was vitally important when explaining technological meaning and practices; however, it decreased the size of the informant sample as a substantial amount of time was spent tracking down particular users.

Methodological decisions also resulted in particular research outcomes. For example, by using ethnographic data collection methods, the researcher gained an in-depth understanding of technological meanings and practices, as well as the community and its members. However, such an understanding was limited in terms of its breadth and the conclusions could only be applied to the research sites. Wider-scale surveys of M-PESA have revealed somewhat different results. For example, Jack and Suri (2010) completed two survey rounds with over 3000 randomly selected households around Kenya, the first in 2008 and the second in 2009. In the first round, it was found that households on average sent and received money via M-PESA every three to four months; in the second, every two to three months. This was much lower than the frequency of transfers that was noted by the financial diaries, which was an average of five and a median of three. As noted above, the frequency of transfers was high amongst split-families because resources were managed across contexts.

The choice was also made to continue research both during, and immediately after, the post-election period. As was made clear in the empirical findings, because of the high rates of inflation and recurrent violence, urban migrants experienced increased demands for money. This also contributed to the high frequency of money transfers within the research sites. The research findings also revealed some instances of reverse money flows; that is, cash flowing from village to city. Such reverse flows would have been much more difficult to capture during periods of political stability.

The researcher also chose to focus closely on the users and their practices. As a result, attention was drawn away from other aspects of the M-PESA story. For example, the thesis briefly mentioned the importance of intermediaries such as the agents. It discussed how agents interacted with the users, and how such interactions shaped the adoption and usage process. It must be made clear that there were numerous other interactions shaping this

process that were not given attention. This includes those between the retail and super agent during liquidity management. The nature of this relationship shaped if, and how, M-PESA was used. If retail agents did not work with the super agents to replenish their cash float, customers were unable to make cash-in and cash-out transactions. The nature of interaction between Safaricom staff and the agents was also not discussed. However, the fieldwork revealed very frequent monitoring by Safaricom field staff. The retail agents were visited at least once per month and the field staff checked their books to ensure that transactions were recorded accurately and that agents were operating according to pre-determined standards. Such monitoring also shaped the trajectory of growth as it increased the consistency of the customer experience across research sites.

Finally, the research process was also shaped by interactions with individuals in Safaricom as well as the mobile money industry. The researcher had regular interaction with Safaricom staff from the onset of the research process. She was provided with a letter from the head of M-PESA that was presented to all agents to facilitate the research process. This was in exchange for regular updates from the researcher during which Safaricom staff made suggestions on some interesting research questions that could be explored further. The researcher also attended several industry conferences on mobile money and had interactions with numerous individuals who also raised some questions that were explored further. For example, the choice to also spend some time looking at agent enrolment strategies was the result of a conversation the researcher had with colleagues at CGAP. The data collected on agents was also used in one of their publications.

Such research choices are important to make clear not only because they shaped the research process. They also weaken the generalizability of the findings. The thesis has presented a very specific example of adoption, usage, and outcomes amongst a small network of village people that spanned Kibera and Bukura. An examination of such processes in other contexts is likely to reveal a very different set of processes and outcomes.

### ***7.3 Contribution to empirical literature***

This study has also contributed to the literature that looks at processes of innovation and examines how technologies become permanent fixtures in communities. More specifically, it has contributed to the literature that Avgerou (2010) classified as “social embeddedness” by identifying factors that shape innovation, which have received little attention in the past. This includes structures of debt and obligation, migration patterns and split family arrangements.



This work has gone one step further and contextualized these micro-level processes within its broader environment. For example, it showed that many used M-PESA for savings because of the under-representation of formal financial services in rural areas. It further showed that it was used for remittances because of the economic inequality in Kenya, with most paid labour being concentrated in urban centers. Such macro-level factors are also vitally important to understand because they also shape if a technology is adopted and how it is used.

The work further substantiates Donner's (2009) argument that the correlation between ICT penetration and "development" cannot be easily captured because social and economic usages are often blurred. This was certainly the case with remittance transfers via M-PESA. The empirical work revealed that these transfers were vitally important for the maintenance of urban-rural relations. They also provided a vital source of livelihoods for the rural residents as remittances constituted a large share of their income inflows. The maintenance of these relations was also vitally important for the urban migrants, who looked to the village for support when life became difficult in the city. Such evidence makes clear that not only are these usages blurred, they are often very difficult to distinguish.

The findings also make a contribution to the emerging M4D literature (Aker, 2008; Donner, 2009; Donner, Verclas & Toyoma, 2009; Jensen, 2001). First, it reinforces Cohen's (2001) argument that mobile phones are vitally important to the solicitation of remittances. It further substantiates Horst's (2006) finding that mobile usage facilitated more frequent and targeted remittance transfers since it allowed recipients to communicate very specific needs for cash. In Kenya, recipients began to make requests for small value transfers both because the mobile phone decreased the cost of making the transfer and also the cost of making the request for cash.

The findings also substantiate Liccope's (2004) finding that specific design features can shape usage. In the case of M-PESA, the pricing structure was vitally important. Urban users urged their rural counterparts to sign up with the service because it decreased their transfer costs. By keeping the transfer rates low, Safaricom also saw an increase in the number of transactions going through the system. M-PESA was also designed so that money transfers could be made at any time if a balance was left on the account. This allowed the user to be more reactive to requests that were made on his cash as the effort required to make the transfer was minimized.

The empirical findings revealed that similar outcomes emerged when the mobile was used for communication and financial services. In regards to the former, Donner (2005) provided evidence that the nature of calling activity changed with increased usage. More specifically, calls became shorter and more frequent. An outcome of this change was more time spent on communication. The research revealed that a similar outcome emerged when the mobile phone was used for remittances. Increased usage resulted in more frequent, and smaller value, money transfers, which then led to more cash being sent to rural areas. The thesis used Licoppe's (2004) concept of connected presence to explain this increase. Money transfer was no longer spatially or temporally bound after the introduction of M-PESA. Users could send money from anywhere, and at anytime.

The work further substantiated Taylor & Harper's (2003) finding that connected presence has changed the expectations and notions of appropriate behaviour surrounding social interaction. In this case, urban migrants were expected to respond to requests for cash more quickly because it was cheaper and easier to make the transfer. The work also confirmed that the process of reciprocation was imbued with messages. Those migrants who took longer to respond were often labeled as "lazy" or "drunkards" by their rural contacts.

The research also showed evidence of the amplification effect. Like Donner (2005), it found that weak link relations were strengthened as a result of increased mobile phone usage. Such relations improved as some urbanites began to respond to requests for "small money" from distant kin and relatives. This allowed the urbanites to accumulate social and symbolic capital with distant relations. The research also found evidence to challenge Licoppe's (2004) argument that one of the outcomes of mobile phone usage is the strengthening of strong link relations. The rise in money transfers back home was to some degree an indication of such strengthening. However, another outcome of increased transfers was a reduction of home visits. It can thus be argued that the relation between usage and amplification is not so straight forward. If migrants continue to decrease the number of home visits, their relation with their rural relatives could be weakened as a result.

The work further confirmed some of the Jack and Suri's (2010) survey findings, which revealed that early adopters had higher levels of education and were wealthier. Their work further revealed that lower-income and unbanked eventually adopted the application. The thesis made clear that the tariff structure was one reason for such growth with this latter

segment. Many urban migrants, who were often the early adopters of M-PESA, convinced their rural relatives to also adopt M-PESA because it was significantly cheaper for them to send to a registered user. The work also confirmed that the majority of individuals sent money to their immediate family. However, the ethnographic findings had a higher proportion of cash being sent to spouses whilst the survey revealed that the majority of cash was sent to parents (29%) and other relatives (18%). Spouses only made up 8% of the M-PESA transactions. Again, the multi-spatial household structure and distance between the two research sites was one reason for the difference in findings.

Jack and Suri's finding that a large proportion (81%) of M-PESA users saved cash on their wallet was also confirmed. However, the work went one step further and made clear how the application fit into the savings portfolios of low-income users and how it acted as a complement to the other mechanisms. More specifically, it had a vital place between the bank and home savings. It was more accessible and cheaper than the bank and allowed users to make more frequent deposits. Users also noted that it was safer than home savings and allowed them to get cash out of the home where it was accessible and thus could be more easily spent. The thesis also made clear that M-PESA also had some shortcomings when used for savings. It did not offer interest as banks, or have a social function like ROSCAs. This is why it acted as a complement, and not a substitute to the other mechanisms.

The branchless banking debate can also be substantiated with the empirical findings (Porteous, 2006a; 2006b; 2007; 2008; 2009; Vodafone, 2007). It was argued that such literature should disaggregate the terms "financial services" and "unbanked". In regards to the former, the findings revealed that savings and remittance usages engendered a very different set of outcomes. Through savings, users were able to hide and spread out their cash whilst through remittances they were able to increase their flows or strengthen relations with relatives. Because of these diverse outcomes, and different usages, the inextricable link between financial service expansion and development should be challenged. In regards to the latter, the work used Wyatt's (2003) category of non-usage to illustrate the various reasons for financial exclusion. It showed that some were expelled from usage because of the high transaction costs whilst others rejected the service because it did not fit into their portfolio of financial mechanisms. Using this evidence, the thesis made clear that policies for financial expansion put too much attention on the excluded. The other categories of the unbanked should also be considered if a larger portion of this segment is to be captured.

Porteous' (2009) argument that branchless banking growth will be driven by remittances was also confirmed. Such a finding is interesting because the usage that drove early adoption is not one that dominates banking transactions. It can thus be argued that the applications that become "transformational", or extend access to a large sector of unbanked individuals, should be designed to fit into existing informal practices of daily life. New services should be introduced after the unbanked users become accustomed to the new product. Ideas for new services can be captured by monitoring the unexpected usages. As the thesis made clear, many individuals started to use M-PESA for small value and frequent savings. Such a usage presents new opportunities for financial service providers to move their products beyond payments to savings.

The thesis also confirmed Collins et al. (2009) finding that resource poor individuals use numerous mechanisms to handle their cash. In the case of M-PESA, the application was integrated into the savings portfolios of users. It was used in conjunction with several other mechanisms—from the bank to cattle. The integration of these diverse resources allowed individuals to spread out their cash and also their risk. If one of the mechanisms failed, cash could be access from another. As mentioned above, some informants who could not access their cash during the post election violence made clear that they withdrew cash from M-PESA to "push through" the period. Informants also depended on their home savings when they could not withdraw the cash kept in M-PESA, either because the network was down or because the agent had run out of float. M-PESA further introduced a new form of value into the portfolio—e-money. Unlike cash or kind savings, e-money was invisible and could not be easily stolen by relatives or was not prone to diseases that could lead to its degradation, as was cattle. Through the diversification of asset forms in the portfolios, resource poor individuals were also managing the risk of being left without cash if one of the other forms was depleted or rendered worthless.

#### **7.4 Contribution to ICT4D and STS debates**

The findings of the thesis can be used to challenge numerous assumptions that are pervasive within the ICT4D literature (UNDP, 2001; Gilhooly & Lal, 2003; Forsyth, 1999; Castells, 2000; Grimes, 2000). The first is related to why technologies are adopted by resource poor individuals. The ICT4D literature often gives very little attention to this question. It presents technological growth as something that is intuitive, and even inevitable, and instead of focusing on *why* technologies diffuse; it puts its attention on *how* to facilitate such growth. As a result, there have been numerous studies focused on how to reconfigure the community,

and the individuals within it, to facilitate technological diffusion. Policymakers have also engaged in such reconfiguration efforts, by integrating technology courses into the school curriculum or working with international suppliers to import ICTs.

Even despite this effort, the outcomes of such efforts have been disappointing. In many cases, technologies have not “trickled down” and been adopted by the poorest segment of the population. The projects also did not meet the developmental goals they were implemented to address. This has resulted in significant loss of donor funds. Many have argued that it would have been much better to invest this money into projects that address more pertinent needs, from healthcare to education.

If the ICT4D community paid more attention to why technologies diffuse, and are adopted by resource poor individuals, they may see a decrease in the number of “failures” or projects that do not engender the expected outcomes. The case of M-PESA was unique because practitioners worked closely with designers to identify local needs and to design technologies to address them. They did not impose their own set of needs, such as “modernity” or “progress” onto the community. Because of this lack of understanding in regards to local needs, technology fixes have been prescribed to deep-rooted social problems, from poverty to social inequality and beyond. This is one of the main reasons for the project “failures” that are so well documented within the literature.

The ICT4D literature and policy also put a significant amount of attention to absences or deficiencies. The look at technologies that are not there, or knowledge that is not there. These absences become driving forces for practitioners who spend time and resources cultivating plans to bridge so-called digital divides. Policymakers need to change their focus if they want technologies to grow. Instead of focusing on absences, they need to look at what is actually present within the communities they hope to reach. In the case of M-PESA, the pilot team not only identified existing needs but also looked closely at habits. They observed that sending money “home”, at least once per month, was something that most Kenyans did. They also noted that the alternatives to sending cash (i.e. bus company or hand) were both expensive and risky, and that there was space for a new money transfer channel. They thus identified a deficiency that was particular to the community and designed the technology appropriately.

There is also very little within the ICT4D literature regarding *how* adoption actually takes place. The majority of empirical studies have presented cases of failures, but there are few studies that have provided an analysis of rapid technological growth. The case of M-PESA

revealed the importance of social networks to the adoption process. The urban migrants, who were the early adopters of the technology, convinced their rural relations to also start using M-PESA. They did so because the pricing was designed to capture these networks; it was cheaper for the sender to make the transaction if the recipient was also registered. By understanding such networks, and designing them into the technologies, ICT4D practitioners can increase adoption rates.

The thesis also revealed the importance of local intermediaries to the adoption process. Although the ICT4D literature has given some attention to this class of individuals, they have mainly looked at intermediaries who are hired by NGOs to work in multi-media centers or Internet kiosks (Bailur, 2010; Stewart & Hyysalo, 2008) Their main function is to answer the questions of local community members and also to help them use the technology. In most cases, the user comes to them for advice and they do not spend too much time seeking out new users.

The case of M-PESA in the two communities presented a much more aggressive class of intermediaries—the agents. These agents did not just provide advice to customers on how to use technologies; they also put a lot of effort into expanding the user base. In some cases, the agents went from door-to-door to promote M-PESA and signed up individuals within their social network. They made such an effort because they were rewarded for each new customer they signed-up and for each cash-in and cash-out transaction that they handled. Because of these selling techniques, the agents were able to capture a segment of low-income customers who may not have walked into the M-PESA shop to sign-up for the service. Other ICT4D projects should also consider integrating more aggressive intermediaries and designing incentive structures to ensure they are rewarded both for acquiring customers and encouraging regular usage.

The thesis has also provided some insight on the role of public-private partnerships (PPP) to technological growth. It has substantiated Unwin's (2005) argument that ICTD partnerships can have substantial impact on poor communities if they are structured and managed in the right way and if all of the interests of the partners are aligned. In regards to the structure, behind the growth of M-PESA were individuals with very different skill sets, from regulators to mobile operators and users. Each of these partners worked together because they would derive some type of benefit if M-PESA grew. The regulators would have a new way to deliver technologies down-market whilst the mobile operators would have a new source of revenue and more loyal customers.

The work also showed the vital importance of system builders in the management of partnerships. These individuals worked to ensure that the incentives of all parties were aligned and that local organizations were integrated into the partnership base from the earliest stages of development. They further ensured that the technology development process was demand driven, and that end-users were also considered key partners. Through such an effort, M-PESA became much more than a North to South technology transfer project. The needs of the local user and organization were understood and the technology was integrated into existing incentives and structures. This made its dislocation by hostile external forces very difficult.

The thesis not only outlined how and why adoption took place, it was also able to capture some of the outcomes that emerged from usage because the focus was on daily life. Some of these changes were very subtle, but had significance within the communities. For example, the village women expressed concern when their husbands sent M-PESA rather than carrying the cash by hand because this change could lead to a variety of other consequences. The men could find a city wife, and eventually decrease the number of transfers they made back home. They could also send the city wife back to the village, which meant that the women sent by the husband would have to be split with another woman.

Such outcomes have not been captured in too many other ICT4D studies because researchers and practitioners do not have a good understanding of the communities in which they work. They also often have a pre-determined monitoring and evaluation framework, which narrows where practitioners look for change. Often, subtle but important changes are either not captured, ignored, or documented as anecdotal evidence. The thesis made clear that such changes are important to monitor because they eventually accumulate into larger scale transformations, or impacts, within the communities. Thus, if the ICT4D researchers start to monitor these outcomes, they may eventually be able to document and better understand the impacts that emerge from the usage of technologies.

The thesis used the outcomes mapping framework (OMF) to make clear the complex relationship between ICT penetration and “development” (Smutylo, 2001). This framework puts its attention on shorter term transformations, which it terms as outcomes, and makes clear that such transformations are important to monitor because they constitute longer term developmental impacts. The OMF further conceptualizes outcomes as inter-dependent. It makes clear that each outcome shapes, and is shaped by, others in the environment.

The thesis presented an analysis of outcomes and emphasized such interdependencies. For example, it showed how the increased rural income inflows could have also been tied to high rates of inflation during the post-election violence. As the prices of goods increased, the villagers had to demand additional cash from their urban contacts. The literature emerging from the international development organizations would benefit from taking a more holistic approach when analyzing how technologies can contribute to development. Such an approach is especially vital since such literature shapes policy. ICTD projects will continue to “fail”, or not result in the desired outcomes, if the various other factors that contribute to adoption and usage are not well understood.

The thesis also challenged the simplistic correlation between activities and outcomes that is made by the OMF. The framework attributes outcomes to a very specific set of activities related to the intervention. It must be noted that such a focus is narrow, as it does not incorporate the numerous other activities that have to occur for the technology to function and grow. In the case of M-PESA, the mobile network was extended into rural areas, handsets became more widely available and the cost of mobile telephony services fell drastically before the application became pervasive. The linear process presented by the OMF does not capture the slew of such activities or the numerous actors involved.

The case of M-PESA in the two communities showed that a very different set of outcomes emerged when the application was used for savings than when it was used for money transfer. This makes it even more difficult to attach a particular set of developmental impacts to a technology. It is not only the usages that lead to divergent outcomes but also the commodities that are circulated by the technology. The most recent information economy, or knowledge society, studies have recognized information as the key productive resource. Policy initiatives have focused on the dissemination of information, and the technologies that can support such dissemination. However, the thesis made clear that outcomes started to emerge because technology facilitated the flow of another vital commodity—money.

When compared to information, money has some fundamental differences as a commodity, which is why its widespread flow engenders a very different set of outcomes. First, it is much more tangible and can result in immediate action. For example, most rural informants withdrew the cash not long after the transfer occurred. In some cases, they used it for household consumption. In others, they purchased productive assets and even addressed shocks that emerged. The fact that this commodity results in immediate action makes the



outcomes easier to track. This is not the case for information. Firstly, not everyone will make use of the information that they acquire via technologies. And as numerous cases of Internet cafes have shown, the information that low-income users seek within these cafes is not the type that will lead to any substantial benefit. If ICT4D practitioners do not want to set themselves up for failure then they must find ways to circumvent this measurement challenge.

The work also speaks to development studies in general, and modernization theories in particular, from which many of the assumptions in the ICT4D literature are derived (Billet, 1993; Rostow, 1959). It calls into question some of the dichotomies that are pervasive within these forms of literature, such as tradition versus modernity. The former is characterized by rigid social hierarchies, simple technologies and agrarian means of production whilst the latter by high consumption, widespread wealth and sophisticated devices.

The empirical evidence made clear that it is no longer easy to make such distinctions. Many of the villagers derived their livelihoods from subsistence farming, used simple farming technologies and techniques to plow and harvest their land, and were embedded in communities that had extremely rigid social structures. However, they also had mobile phones and very frequently made use of money transfer application that had failed to take off in most Northern countries. More interestingly, the presence of the “modern” technologies did not cause significant shifts in other spheres of daily life, as many theorists predicted. This challenges the assumption that communities need to be reconfigured for technologies to grow.

Modernization theorists also present a homogenized version of the modernization process but also expect the outcome, “modernity” to be uniform across contexts. Thus, modern Cincinnati should not look much different than modern Bukura if both progress along the same developmental path. But the empirical findings showed that such a progression was not happening as conceived of by the theorists. New technologies existed alongside old ways of doing things, and did not shamble “tradition”.

If the process cannot be homogenized, it can also be argued that the outcome, or “modernity”, also takes on a unique form in Bukura and Kibera. Early modernization theorists could not have conceived of a subsistence farmer holding an electronic form of value on his mobile phone, or billions of invisible shillings being circulated through some of the poorest regions of Kenya. The case of M-PESA highlights that modernity is not a simple, nor is it a universal process that is disseminated from West to “rest”. Rather, it is

independently produced and integrated into existing structures and material worlds. As a result, it takes on its own unique form across communities. Any description of modernity must thus emerge from empirical investigation and not methodological presuppositions and take into account the very diverse experiences of both technology and adoption.

It is not only conceptualizations of modernity that should be questioned but also those of technology. Modernization theorists often black box technologies and present them as objects, such as a mobile phone or Internet, rather than systems. This is problematic because it obscures all of the work that is needed for technologies to spread to a community and be adopted by its members. It further obscures the local usages, and does not make clear what the technology becomes as it introduced into different contexts. Modernization theorists further present a decontextualized image of technological rationality, which leaves little room for the investigation of the complex, and sometimes messy, processes of technological growth. Such processes are important to elucidate, especially for rapidly growing technologies such as M-PESA, because they can reveal lessons that can be applied to facilitate adoption in other contexts.

Central to modernization theory is also the transformative nature of technologies. More specifically, some type of input can be processed through a technology and turned into something that is more useful than its initial form, whether it be information or materials and energy. In the case of M-PESA, cash and e-money were being constantly converted. Such transformations reduced the value of the commodity because of the withdrawal and transfer fees. The outcomes did not emerge as a result of the transformations, but the circulation of cash that the technology facilitated. In electronic form, cash could more quickly flow and the recipients were more easily able to react to shocks that emerged in their homes.

The empirical findings can also be used to call into question another form of “transformations” that are discussing within modernization studies. These transformations are characterized by substantial changes in several spheres, from economic structures to socio-political institutions and cultural beliefs. Each transformation is driven by technology, and requires fundamental changes not only to the patterns of human life but also to structures of relations. The modernization literature also assumes not only that individuals in resource poor communities are able to cope with these changes; it also assumes that they demand them. But in the case of M-PESA, the urban migrants adopted the technology not to change, but to maintain how they lived. The money transfers that M-PESA facilitated were part of a much larger structure of exchange that helped informants reinforce their identities and

position within societies. Such a finding makes clear that new technologies can also be used to maintain old structures and habits.

In much of the development literature, there is also the assumption that technological growth can be easily replicated. This is especially the case if a technology manages to grow quickly in a resource poor community, as was the case with M-PESA. Aside from the mobile phone, there have been very ICTs that have scaled across contexts. The case of mobile money reinforces that technologies have very different growth trajectories. Inspired by the popularity of M-PESA, numerous other countries in African and Latin America have introduced similar services. However, the growth rates have been differential and often disappointing. This confirms that technological development, and growth is a contingent process. If mobile money applications are to scale in these other contexts they must be tailored not only to the needs of the user but also to the environment.

It is not only the growth process that will be differential, but also the outcomes that emerge within the communities. The thesis made clear that these outcomes emerged as a result of changing habits. Thus, rural cash flows increased because urban migrants started to make more frequent transfers back to the village. The outcomes were also tied to other events that affected daily life. Rural cash flows also increased because there were high rates of inflation in the communities as a result of the post-election violence. The rural dwellers needed more money to meet their daily needs and looked to their urban contacts for support. Because these outcomes were contingent on events and practices, it is unlikely that they will be replicated in other contexts. Development practitioners must thus be careful when setting their expectations for the types of impacts that will emerge in other communities as a result of their interventions.

The empirical findings further made clear that outcomes were often contradictory. For example, increased usage led to the accumulation of social capital and the strengthening of urban-rural relations. But this process was not without its costs as it also resulted in a decrease in economic capital. New struggles also emerged over scarce economic resources as money could be spent more easily and cheaply. Such struggles, and depletion of resources, make clear that the relationship between technologies and “development” is not so simple.

The thesis contributed to the STS literature in general and domestication theory in particular (Oudshoorn & Pinch, 2003; Lie & Sorenson, 1996; Williams, Stewart et al. 2005). Firstly, it challenged Oudshoorn & Pinch’s (2003) concept of stabilization by showing how the meanings and usages associated with the mobile phone changed with the introduction of M-

PESA. The device became much more than a tool for communication. It became a “bank” and a vital mechanism for the maintenance of urban-rural relations. This finding is interesting because it makes clear how applications can alter the meaning and usage patterns of the phone. If such applications continue to be introduced into the market then the mobile phone will most likely go through several iterations of the domestication process and never reach “stabilization”.

The work has also presented the domestication process in the context of resource poor communities. This is a significant contribution because the majority of such work has been carried out in Northern countries, aside from Hahn & Kibora’s (2008) application of the framework in Burkina Faso. Because of the change in context, the analysis has revealed additional factors that shape this process. This includes beliefs about death, migration patterns, familial structures and political violence. The research further put its emphasis on the meanings attached to the practices rather than the technology. It made clear that such meanings are derived from, and embedded in, larger social structures. This is why technological activity also has a vital social function. By sending money home, the migrants were making clear that they had not forgotten their obligation to their natal homes.

Perhaps the most significant contribution of this work to STS literature is in its ability to provide an account of technological development, from both the micro and macro perspectives. As a starting point, the thesis revealed a more systemic account of such development by showing how elements, from regulatory frameworks to CEOs, were aligned in the socio-technical system to facilitate technological growth. It thereafter turned its attention to adoption within specific communities and integrated the user, and technological practices into the analysis. Through such integration it also revealed the work that had to be done at the micro-level for technologies to be integrated into daily life. The thesis also revealed how the macro and micro level elements shaped each other. For example, the unequal distribution of cash, with the majority being concentrated in urban centres, was one reason for the urban to rural cash flows. Such misdistribution also shaped the urban-rural remittance practices, with many villagers depending on their urban contacts for support. Through such a multi-faceted analysis the thesis was able to outline why technological practices emerged, and also explain why they were sustained.

The work also traced the evolution of remittance practices, starting from their emergence in the colonial era. It was made clear that the establishment of a tax huts, and the introduction

of new goods into the market such as bicycles, tea, and sugar, caused many migrants to move to the city to earn cash. A portion of that cash was sent back home to rural relatives. The work made clear that such practices became a vital part of daily life, with the urban economy growing and new opportunities for work emerging in the city. Such an analysis is important because it provides a historical context for the practices, which is often missing in the STS literature. Knowing *why* practices were engrained in daily life, makes it easier to explain how a technology like M-PESA which was designed to fit into such practices could grow so rapidly.

The work has also concentrated on gender relations and technology within these resource poor communities. Such relations have been given little attention within the STS literature as Northern women, and their technologies, have been the focus of inquiry (Wajcman, 2010). The empirical findings made clear how gender relations were embedded into the technology. The remittance practices that M-PESA facilitated were bound in larger structures of patriarchal relations and helped to reinforce inequality between men and women. Urban men were able to uphold their dominant position within the multi-spatial household by sending money home “regularly”. Rural women became dependent on these relations, either by choice or force, and their livelihoods were strongly bound to their supporter. This meant that any event in the city—from the loss of work to the gain of an additional wife—could decrease the rural income inflows and increase the vulnerability of the women and her children.

The thesis also made clear that women would use the technology to circumvent the restrictions placed on them by their husbands and fathers. M-PESA allowed them to receive cash more easily from other contacts because the cost of the transaction was low and because the transfer itself was not visible. This left the women less dependent on their husbands for their livelihoods and enabled them to receive smaller value transfers from a wider network of remitters. The fact that M-PESA rendered cash invisible was also attractive to the women who stayed in the same house as their husband. A portion of men wanted to have complete control over the household finances, including the savings of their wives, to limit the autonomy of the women. By moving a portion of their savings from the home to M-PESA, the women were decreasing the risk of their savings being depleted if found by their husbands.

Such particular cases make clear that the term “women” should also be disaggregated within the STS literature to accommodate the plurality of living situations outside of Northern contexts. This should especially be done to accommodate the differences in female agency across contexts. Technological strategies of subversion are much different in resource poor, and patriarchal societies, as women must navigate very carefully to not upset the men who control the resources. Any visibility in their strategies of subversion could have vital consequences—the reduction or elimination of their main livelihood source.

The STS literature also puts more attention to the gendering of technology at design than at stages of consumption and usage. By looking at the meaning and frequency of practices, the empirical work showed how technological usage reinforced gender roles within communities. A “good African man” or “good son” thus sent money home “regularly”, or aligned his money transfers back home to rhythm of end-month remittances transfers that existed within the community. To deviate from this societal rhythm, either by sending money home too often or not enough, was considered deviant behaviour and punishable. Those who did not send money home “regularly” risked coming home to angry relatives.

To capture technological meaning, the thesis contextualized such practices within a structure that Shipton (2007) described as generalized reciprocity. Such a structure pervaded the life of individuals in both research sites. It was manifested in practices of borrowing and lending called entrustment. Through these practices, individuals were strengthening their network of relations. They were further reinforcing their positions within the social order. In this context, M-PESA was vitally important because it made it easier and cheaper for individuals to engage in these processes of exchange.

Such contextualization is important. Because technological practices are embedded in social structures, any change to such practices can also shape social arrangements. This was revealed in the discussion of outcomes and impact, which highlighted the numerous social consequences that emerged from usage. This includes the challenging and reinforcement of urban-rural dependencies. It also includes new struggles over limited resource. This evidence of changing practices and outcomes elucidates the link between technologies and society. More specifically, it shows that technologies do *catalyse* and *make possible* new forms of practice, even though they do not *determine* them.

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## Appendix A: Detailed research schedule

<b>Date</b>	<b>Location</b>
Sept 27	Looking for field sites
Oct 12	Visited Kibera for the first time
Oct 12-Dec 17	Kibera (2-3 times per week)
Feb 4-Feb 6	Kibera
Feb 18-March 4	Kakamega and surrounding areas (first visit)
March 5-March 10	Kibera
March 11-March 22	Bukura
May 5-May 12	Bukura
May 30-June 5	Kibera
June 6- June 25	Bukura
June 30-July 6	Kibera
August 26-Sept 25	Kibera
September 26-October 15	Bukura
October 15-December 1	Kibera

## Appendix B: List of informants

<b>Name</b>	<b>Position</b>	<b>Organization</b>	<b>Date</b>
Pauline Vaughan	Head of M-PESA	Safaricom	Sept 12, 2007
Stefan Staschen	Consultant	CGAP	Sept 14, 2007
Pauline Vaughan	Head of M-PESA	Safaricom	February 11, 2008
Pauline Vaughan	Head of M-PESA	Safaricom	March 6, 2008
Anon	District Officer (Chief)	Government	March 10, 2008
Anon	-	Faulu Kenya	April 30, 2008
Nick Hughes	Head of Operations	Vodafone	May 20, 2008
Corrinne Ngurukie	Researcher	Microsave	May 22, 2008
Andy Cheung	Strategic Business Development Manager	Vodafone	May 28, 2008
Susie Lonie	Mobile Commerce Project manager	Vodafone	June 4, 2008
Pauline Vaughan	Head of M-PESA	Safaricom	June 4, 2008
Pauline Vaughan	Head of M-PESA	Safaricom	August 28, 2008
Pauline Vaughan	Head of M-PESA	Safaricom	September 5, 2008



## Appendix C: Lexicon word list

Cash/ Money	Credit	Send money home
Coin	Go broke	Money transfer
Bill	Bad investment	Gift
5 Ksh	Good investment	Lend
10 Ksh	Bankrupt	Loan
20 Ksh	Poverty	Debt
50 Ksh	Wealth	Borrow
100 Ksh	Rich man	Repay Loan
200 Ksh	Rich woman	Invest
500 Ksh	Poor man	Investment
1000 Ksh	Poor woman	
Savings	Salary	
Save	Income	
Bank	Spend	
Money saved in the home	Rent	
Post Office	Tax	
Savings group	Inflation	
ROSCA	Account	
ASCA	Bargain	
Withdraw money	Cash flow	
Deposit money	Insurance	
Remittance	Interest	
Send money	Financial loss	
Receive money	Retirement	
M-PESA	Cash economy/cash society	

## Appendix D: Group interviews

<b>Group Name</b>	<b>Date</b>	<b>Location</b>
Women who do not receive any remittances	May 7	Matiolo
Women who have husbands in the city	May 7	Matiolo
Women who receive remittances regularly via M-PESA	May 8	Bukura
Women who are part of a savings group	May 8	Matiolo
Young men with wives in the village	May 30	Kibera
Young women-M-PESA users	May 30	Kibera
Women's savings groups	May 31	Kibera
Young men with wives	May 31	Kibera
People who don't use M-PESA to send money	May 31	Kibera
Agents	May 31	Kibera
Agents	June 1	Kibera
Women in the rural who receive money via M-PESA	June 17	Bukura
Women in the rural who receive money via M-PESA	June 18	Bukura
Boda Boda boys	June 19	Bukura
Women who had husbands in the city (repeat group)	June 20	Matiolo
Boda boda boys	June 20	Bukura
Young men-lexicon group	August 28	Kibera
Women-lexicon group	August 28	Kibera
Middle aged men-lexicon group	September 1	Kibera
Mixed group-lexicon group	September 1	Kibera
Frequent Users	September 5	Kibera

## Appendix E: Financial diaries

A description of the fourteen participants is given in the table below. Eight of the participants came from Kibera and six came from villages in Western Kenya. Seven of the urban participants were male, and one was female. All of the rural participants were female. Five of the six women were married to the urban participants. This facilitated the monitoring of income flows between urban and rural areas.

All of the participants either sent or received remittances. Twelve of the fourteen in the sample used M-PESA to do so. Two of the participants—Wyclif and his wife Eunice—did not use the application. Wyclif would send money home to his Father through his friends. Wyclif’s Father would then pass on a portion of that money to Eunice. There was an attempt to integrate more non-users into the sample. However, the diaries of the other non-users were not returned.

The majority of the participants in Kibera were informally employed as tradesmen. Many operated small businesses within the informal settlement. Only two participants were formally employed as security guards. In the villages, most of participants sold goods from their farm to make extra money. Some sold these goods on the local market, whilst others sold to their neighbours and friends.

Finally, five of the fourteen participants had a bank account. All of these banked participants resided in Kibera. The rest of the sample used a combination of informal savings mechanisms to store their money. This was described in the empirical findings.

Name	Location	Job	M-PESA User/Non user	Banked/Unbanked	Relation to Diary Participant
Wyclif	Urban- Kibera	Barber	Non User-sender	Unbanked	Married to Eunice
Eunice	Rural- Chamarmar	Farm work, fetch water	Non user	Unbanked	Married to Wyclif
Lawrence	Urban-Kibera	Painter	User-sender	Unbanked	
Brown	Urban-Kibera	Security guard	User-sender	Banked	Married to Betty
Betty	Rural-Bukura	Sold goods from shamba	User-recipient	Unbanked	Married to Brown

Violet	Rural-Eshirumba	Not working	User-recipient	Unbanked	Betty's friend
Gaudezina	Rural-Shangalangwi	Sold goods from shamba	User-recipient	Unbanked	Betty's Mother
John	Urban-Kibera	Security guard and shop owner	User-sender	Banked	
Sylvester	Urban-Kibera	Security guard and shop owner	User-sender	Banked	Married to Elizabeth
Elizabeth	Rural-Sikarira	Sold goods on market-table cloth etc.	User-recipient	Unbanked	Married to Sylvester
Martin	Urban-Kibera	Shoe repair	User-sender	Unbanked	Married to Margaret
Margaret	Rural-Masiro	Sells goods from shamba	User-recipient	Unbanked	Married to Martin
Joyce	Urban-Kibera	Shop owner	User-recipient	Banked	
Patrik	Urban-Kibera	Pastor	User-sender and recipient	Banked	

## **Appendix F: Richard's side of the story**

My name is Richard Amwayi Namolo, born 1979 according to my birth certificate but in my national ID card says I was born on January 21 1980. I was not born and brought up, we only moved to Kibera when I was 14. Before then my started in Huruma slums, then later moved to Dandora, then to Kangemi and from Kangemi is now when I moved with my Mother to Kibera. We moved to Kibera because my parents had separated and my father was not ready to take care of us and he married another woman. Life became so hard and with prayers and hope, we moved on by the grace of God. I went to school in Parklands primary and later joined Makina Self Help Primary school where I completed my and acquired the Kenya Certificate of Primary education. Later I joined Parklands Secondary for my O levels but confusion could not let me finish, so dropped out while I was in Form 2.

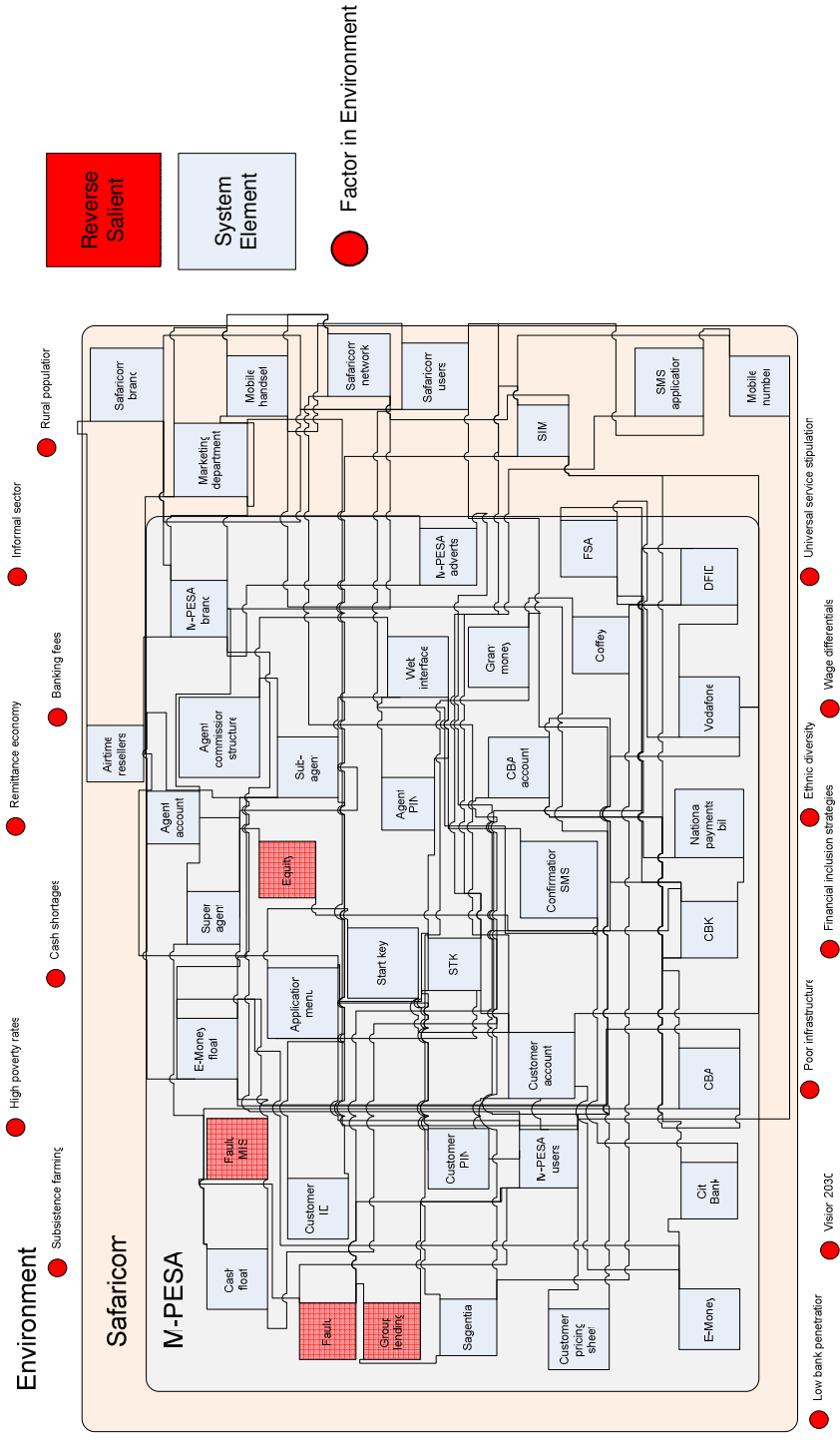
Life became more challenging, but I never gave up cause I knew this was a learning experience and so I learnt a lot and I am still learning. With the inborn gift I have I have been able to achieve some of my short-term goals and I am looking forward in achieving more. I am simple freelance performing artist. I am specialized in acting, directing and scripting. I have received informal trainings from different institutions for example University of Winchester, PSI, CARE Kenya and from watching TV movies, soap Operas, comedies and from friends. My acting talent has exposed me a lot and at the currently I am Volunteering with an organization namely Kibera Community Youth Programme. This is where I met Olga and started working for her as a research assistant. It was nice working with her and from the same I have learnt a lot. We met back in September 2007. We did introduce ourselves to each other, shared our values, objectives, expectations and what we stand for. From this, I realized we shared something. My work for her research was to Identify people to be interviewed, come up with route maps, language interpretation, guide and security while in the slums and in the rural villages.

The experience was good but only a few hiccups of which I was able to overcome. Some of the challenges were as follows:

- Negative perception from the people being interviewed
- People wanting to be paid for their time
- Language and different levels of education and
- Inferiority complex.

I was able to overcome the challenges because first I am familiar with the people living in the slums; I understand their language and their way of thinking. I also respected them and explained honestly, why I was assisting Olga with this research. I also told the participants to feel free and terminate the sessions whenever they felt uncomfortable. I also mobilized people I know well and some connected us to others they know especially in the rural villages. This made our work easier despite the financial challenge, which I personally understood and knew that Olga was still a student, and she was doing this for her PhD no other commercial benefits. Although she had to compensate my time. After we finished we promised each to keep and in case of something positive, we share. To be honest Lady Olga kept her word I too kept, up to date we communicate through e-mail, and she has been able to secure for me two-research jobs that I did in January. My scope has widely been opened up and I wish to pursue training in video shooting, editing research, radio and TV production. This will need support from different ends.

# Appendix G: M-PESA systems diagram



## Appendix H: M-PESA partners

Partner Name	Nature of business	Added function
Kenya Power and Lighting Company (KPLC)	Utility company	Allows customers to pay electricity bills via M-PESA.
AAR Health Services, National Hospital Insurance Fund (NHIF), AAR GROUP CARE LTD.	Health care company	Allows customers to pay health bills via M-PESA.
GTV, Multichoice Kenya Ltd	Television company	Allows for the payment of TV bills via M-PESA.
Madison Insurance Company Limited, Old Mutual Investment Services, AON Minet Insurance Brokers, Pioneer Assurance Brokers, The Co-Operative Insurance Co. of Kenya Ltd.	Insurance company	Allows for insurance payments via M-PESA.
Youth Enterprise Development Fund, Higher Education Loans Board (Helb)	State corporation	Allows for the repayment of youth development and educational loans via M-PESA.
Paynet Kenya	ATM service provider	Customers can make M-PESA withdrawals from Paynet's ATMs. There are 110 located nationwide.
Kenya Post Office Savings, Equity, Housing Finance, Family Bank, Agricultural Finance Corporation, Giro Commercial, Baringo Teachers, Kirinyaga Farmers, Meru South Farmers, Wakenya, Pamoja, Mungania Tea	Banks/MFIs/SACCOs	Act as M-PESA agents and facilitated cash-in and cash-out services.



Uchumi, Nakumatt	Grocery stores	Act as M-PESA agents and facilitated cash-in and cash-out services.
Pep Intermedius	M-PESA super agent	Facilitates cash in and cash out at over 70 locations in Western Kenya.
SMEP	MFI	Customers can make their monthly loan repayments and savings contributions via M-PESA.
Kenya Commercial Bank	Bank	Makes it easier for M-PESA agents to acquire money (both physical and electronic).
Western Union	Money transfer service	To facilitate cross-border remittance transfers.
Nation Newspaper Vendor, Nation Online Obituaries, Nation Online Directory, Nation Online Classifieds, TBN Family Media Ltd.	Media companies	Allows for the payment of media products and services via M-PESA.
Ecta, Solo Trading	Parts and vehicle company	Allows for the payments of parts and services via M-PESA.
Concern World Wide	Charitable organization	Social payments disbursed via M-PESA during the post-election violence.
Wakenya Pamoja	SACCO	Allows for salary disbursements via M-PESA.