Spreading Kenya's Mobile Payment Success to Neighboring Countries – The Case of Rwanda

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ABSTRACT

Kenya's highly successful mobile payment (m-payment) ecosystem – and in particular its 'star' service 'M-Pesa' – have been investigated in academic works (Foster and Heeks 2013; Jack et al. 2010; Orlikowski and Barrett 2014) and have attracted global media and policy attention. However, research on transferring such success to neighboring countries remains limited. In this paper, we examine m-payment services in Rwanda and compare the country's dominant service offering 'Mobile Money' to its Kenyan role model. Along ten factors suitable for assessing the potential contribution and the adoption of m-payment services in developing countries, we find several anchor points where Rwanda – to the better of its economy and national welfare – could learn from Kenya. Thereupon, we recommend establishing a regulatory framework, promoting adequate electricity as well as telecommunication infrastructures, and requiring – almost imposing – collaboration among stakeholders. Further, we find the need for Rwandan m-payment providers to build comprehensive distribution network of properly incentivized agents, especially in the country's rural areas with 85% of its population live.

Keywords: ICT4D, Mobile Payment, Emerging Markets, eBusiness Services, Rwanda

INTRODUCTION

Kenya, referred to as the 'Silicon Savannah', has been the epi-center of mobile payment (m-payment) across sub-Saharan Africa (Jack et al. 2010; Orlikowski and Barrett 2014). M-payment is defined as a financial transaction where at least one of the transaction partners uses mobile communication devices such as mobile phone or tablet computer (Kreyer et al. 2002). It allows for transferring of monetary value, paying for goods and services, and covering bills (Henkel, 2002; Ondrus and Pigneur 2006; Teo et al. 2005). Thereby, m-payment contributes to fostering economic activities also among formerly unbanked private and business entities (Foster and Heeks 2013).

In 2007, Safaricom, Kenya's largest mobile operator, launched its m-payment service M-Pesa ('M' for mobile and 'Pesa' for money in Swahili). Since then, the growth of M-Pesa has been impressive (Loudon 2016); the number of registered users rose from 268,000 in 2007 to more than 22 million in 2015 (Communications Authority of Kenya 2015).

In most other East African Community (EAC) countries, m-payment initiatives have been barely successful. For instance, with an underdeveloped and ineffective financial infrastructure and hence a large unbanked population, the Rwandan government launched the 'Smart Rwanda' agenda in a country. One major element of the agenda has been fostering the diffusion of m-payment to address the country's financial inclusion gap. However, the uptake of m-payment services is still considered insufficient by most stakeholders.

In this paper, we investigate how Rwanda could replicate Kenya's m-payment success. We thereby hope to trigger a stronger adoption of m-payment in Rwanda, which in turn should yield economic and welfare benefits such as the creation of jobs, a more diversified portfolio of economic activities, and increased national welfare.

IMPORTANCE OF M-PAYMENT SERVICES IN DEVELOPING COUNTRIES

The literature (Evans and Pirchio 2015; Mas 2015; Nuwagaba 2014; Porteous 2006) has shown that a strong m-payment uptake brings positive returns to all stakeholders in developing countries. It increases liquidity, enlarges savings, and hence enhances financial security.

Numerous works (Demombynes and Thegeya 2012; Jack and Suri 2011; Mas and Radcliffe 2010) have studied the case of M-Pesa in Kenya from various angles leading to a number of promising insights: They point to the liquidity effects and the accumulation of 'social capital' triggered by M-Pesa. Their finding shows how M-Pesa facilitates transactions, increases employment, and enlarges savings and thus overall makes Kenya economically less vulnerable. Accompanied with a platform for developing new services, M-Pesa boosts the entrepreneurship rate, enhances the performance of small enterprises (Kendall et al. 2011; Mbogo 2010) and empowers women in the economy (Morawczynski 2009; Plyler et al. 2010). Family members in urban areas are no longer required to make overnight trips to the countryside; they neither need to count on friends and public drivers to deliver payments (Fengler 2012; Jack and Suri 2011).

Other countries also have success stories: Catia and Pedro (2012) observed that m-payment substituted for traditional, financial services increasing both savings and transactions in Mozambique. Aker et al. (2013) found that rolling out m-payment reduced the overall transaction costs while increasing in freedom, flexibility, and privacy in Niger. And the use of

mobile money services provided benefits of time, security and convenience for micro-entrepreneurs especially in rural Cambodia (Vong et al. 2012).

M-PAYMENT SUCCESS FACTORS

From the m-payment literature (Argent et al. 2013; Boer and de Boer 2009; Camner et al. 2009; Darren et al. 2013; Dayadhar 2015; Evans and Pirchio 2015; Heyer and Mas 2011; Hughes and Lonie 2007; Jack and Suri 2011; Jane 2015; Luarn and Lin 2005; Mas 2015; Merritt 2010; Muthiora 2015; Ndiwalana and Popov 2008; Schierz et al. 2010; Wang et al. 2003), we obtained a list of ten factors that had been found to contribute to the success of m-payment – particularly in the context of small developing countries.

The ten selected factors are (1) the *Regulatory Setting,* (2) encouraged or imposed *Collaboration among Stakeholders,* (3) the *Financial Infrastructure (before m-payment launch),* (4) the continuous availability of *Electricity,* (5) the *Mobile Phone Penetration* in the country, (6) the *Market Development Model,* (7) *the Mobile Network Operator's (MNO's) Distribution Networks (Agents),* (8) any *Interoperability (enabling inter-organizational transactions)* provided by the MNO, (9) the MNO's *Fee Structure,* and (10) the *Technological Standard used for providing the service.*

At this exploratory stage of our work, we have no ground for ranking the factors – neither for Rwanda, nor for any other country. Instead we think that it is important and recommendable to various stakeholders to tackle all ten factors in any small developing country, in order to pursue the opportunities resulting from m-payment services. Therefore, in the following we introduce the ten factors and the arguments behind them without any research based order.

(1) The *Regulatory Setting* determines what types of private or public institutions can offer m-payment services to what extent and in which contexts (Heyer and Mas 2011).

(2) Fostered *Collaboration among Stakeholders* such as telecommunications operators, payment processors, regulatory agencies, government departments, and the private sector promotes the development of guidelines for the financial market and sets the strategic direction with regard to m-payment services (Muthiora 2015; Ndiwalana and Popov 2008).

(3) The quality of the *Financial Infrastructure (before m-payment launch)* influences the m-payment adoption in a country; some existing infrastructure is a prerequisite for any m-payment diffusion. This means that a very poor financial services infrastructure makes m-payment adoption difficult as liquidity management is challenging. However, from a certain service level onwards, traditional 'poor quality' financial services rather foster the adoption of m-payment services which offer higher efficiency, better accessibility, and more convenience than the existing services (Camner et al. 2009; Mas 2015).

(4) The availability of *Electricity,* also in remote rural areas, drives the deployment of m-payment (Heyer and Mas 2011; Hughes and Lonie 2007; Jane 2015; Mas 2015).

(5) The *Mobile Phone Penetration* affects the adoption of m-payment services, although they can alternatively be used by involving an agent (Jack and Suri 2011).

(6) The two most popular *Market Development Models* are a (1) bank-led model with additional services to existing customers through a mobile banking application; and a (2)

MNO-led model with transformational outreach to the unbanked population (Boer and de Boer 2009; Evans and Pirchio 2015; Merritt 2010). Middle-income countries such as South Africa use mostly bank-led models; they build on a relatively well developed financial sector which offers diverse distribution channels such as traditional branches, ATMs, mini-ATMs, mobile phones and debit/credit cards (Evans and Pirchio 2015). In contrast, African low-income countries such as Kenya and Rwanda typically deploy MNO-led models.

(7) An *MNO's Distribution Network (Agents)* expands an MNO's reach to rural areas with no physical bank presence (Hughes and Lonie 2007). Such agent networks are the cornerstone to any m-payment roll-out (Luarn and Lin 2005; Schierz et al. 2010; Wang et al. 2003). Agents are the quasi point-of-sale for the MNO. Their primary role is to open accounts, accept, and disburse cash and to provide cash-in and cash-out services from a consumer's mobile device. Agents know the end-customers and thus can offer some 'due diligence' to the MNO.

(8) *Interoperability (enabling inter-organizational transactions)* among MNOs and various banks or among a number of MNOs enables users to make m-payment transactions with any other user via a single transaction account (Argent et al. 2013).

(9) The MNO's *Fee Structure* describes how an MNO earns money from offering m-payment services. Typical fee structure elements are fixed, usage-dependent, and additional fees customers have to pay (Camner et al. 2009).

(10) A *Technological Standard* is necessary to provide m-payment services. Commonly deployed standards are the (1) Unstructured Supplementary Service Data (USSD) and the (2) Sim Application Toolkit (STK). USSD works with most phones via 'quick codes' (e.g., '*789#'); it offers usability and security advantages without requiring changes to the existing SIM or demanding a new SIM (Dayadhar 2015). The STK offers an app that users can access via a phone in order to communicate, for instance via SMS. Particularly important in developing countries is that none of the two standards requires an internet connection or smartphone (Boer and de Boer 2009; Darren et al. 2013).

DATA COLLECTION

This qualitative study investigates Rwanda's dominant m-payment service 'Mobile Money' and compares the country's to the Kenyan role model M-Pesa (Heyer and Mas 2011; Loudon 2016; Morawczynski 2009). Rwanda's 'Mobile Money' is provided by the South-Africa based MNO called MTN. In Rwanda, Mobile Money Service has a market share of 50% and experiences significant roll-out progress compared to other Rwandan m-payment services.

Our data sources include interviews, documents, and public databases. In total, we conducted eighteen semi-structured expert interviews, each lasting between 20 and 90 minutes. The interview guide addressed the identified ten factors (see previous section) for assessing the potential contribution and the adoption of m-payment services in developing countries. We applied purposeful sampling (Patton 2002) for choosing the interviewees. Thereby we could

benefit from the first author's long-time work at the Rwandan Regulatory Authority.[1] The interviewees encompassed six middle and top level managers of the Rwandan Regulatory Authority's ICT department, the former CIO of the Communications Authority of Kenya, four employees of the East African Communications Organization, two employees of MTN, two employees of Safaricom, and three employees of the Rwandan National Bank. The interviews took place between January and April 2016. We took extensive field notes during and immediately after each interview.

Concerning the analysis of documents, we enjoyed unrestricted access to all documents of the Rwandan Regulatory Authority including technological review reports, market research papers, and m-payment reports (Argent et al. 2013; Bourreau and Valletti 2015; Communications Authority of Kenya 2015; Consultative Group to Assist the Poor 2015; Consultative Group to Assist the Poor 2010; Demombynes and Thegeya 2012; FinAccess 2007; Jack and Suri 2011; Kariuki 2015; Mas and Radcliffe 2010; Merritt 2010; Muthiora 2015; National Bank of Kenya 2015; National Bank of Rwanda 2015; National Institute of Statistics of Rwanda 2015; Porteous 2006; Rwanda Utilities Regulatory Authority 2015).

As part of our desk research, we reviewed case studies on m-payment market scenarios in specific regions and countries (e.g., Jane 2015; Mbogo 2010; Morawczynski 2009; Nuwagaba 2014, Orlikowski and Barrett 2014).

Last, but not least, we checked the websites of East African m-payment providers, regulators, as well as those of global m-payment players such as Mobey Forum, NFC forum, GSMA, MasterCard on Mobile Payment Readiness Index.

M-PESA – THE M-PAYMENT ROLE MODEL FROM KENYA

In the following, we investigate M-Pesa for studying a successful launch and diffusion of an m-payment service in a developing country.

In 2007, Safaricom, Kenya's largest mobile operator, introduced the country's first and still most popular m-payment service M-Pesa to the market. Since then, the growth of M-Pesa has been impressive (Loudon 2016; Orlikowski and Barrett 2014). In July 2007, there were just over 268,000 registered users. Two years later, the number increased to 7.5 million, representing 34% of the adult population. Today, M-Pesa leads the market with more than 22 million subscribers (Communications Authority of Kenya 2015). Number two and three in the market are Airtel Money (Airtel Networks Kenya) with 3.1 million subscribers and Mobikash (Mobicom Kenya) with 1.7 million (Loudon 2016). All m-payment services in Kenya offer a broad array of financial services and transactions.

To provide a basis for later comparing Rwanda's Mobile Money to M-Pesa, we organize our study of Safaricom's M-Pesa along the ten factors introduced above.

R*egulatory Setting:* Safaricom could launch M-Pesa upon a simple 'no objection' letter from Kenya's national central bank, which regulates the country's m-payment providers. This letter allowed Safaricom to innovate and pilot test its service. Thus Safaricom could learn without

[1] Throughout the data analysis, we paid attention to avoid any researcher bias resulting from one author being actively involved in Rwanda's regulatory work in ICT and e-commerce.

facing regulatory constrains as an MNO or a financial institution. Said R. Ngotwa (former CIO of Kenyan Communications Authority):

> "Regulatory efforts here in Kenya have taken into account the linkages between regulation and innovation. The 'no objection letter' has allowed the incumbent Safaricom to maximize positive effects of innovation."
>
> R. Ngotwa (former CIO of Kenyan Communications Authority) – 2016

Safaricom is required to deposit customer funds in a financial institution. Individuals can accumulate savings in their m-payment accounts over time; the savings are 100% backed by deposits held at three commercial banks in Kenya. After a certain period, the deposits earn interests, which the bank transfers to Safaricom; the MNO can then decide how to spend the interests (Jack et al. 2010). Safaricom donates the interests gained from M-Pesa accounts to a charity. This avoids that Safaricom gets regulated like a bank, and it helps the firm gaining trust throughout the population (Kariuki 2015).

Collaboration among Stakeholders: In 2012, Kenya's government established the Centre for Research on Financial Markets and Policy. The center sponsors original research, provides consulting, and hosts conferences on key financial market issues involving scholars and practitioners (Kariuki 2015). Through these activities, the center acts as a platform for intellectual engagement and dialog between financial market experts, the banking sector and policy makers in Kenya. It played a key role in developing the guidelines for financial market and continuously provides strategic direction to of m-payment services in Kenya.

Financial Infrastructure (before m-payment launch): Poor payment alternatives in Kenya have enabled Safaricom to outperform other (established) players in the market. Before the launch of M-Pesa, almost 60% of the unbanked population transferred money via friends and family (FinAccess 2007) in spite of risks and trust issues involved (Moracyznski 2008).

> "Kenyans used to give an envelope to a bus driver and ask him to drop it off in the town he was driving to. Or they took a taxi or a bus to bring money home. It was generally expensive, slow, and insecure. M-Pesa came on time; we made it work!"
>
> L. Onyando (Safaricom employee) – 2016

Electricity: Safaricom collaborates with energy providers who combine wind, solar power, and diesel to overcome M-Pesa's power shortage concerns (Lixing and Tao 2009).

> *"*Our focus is on solving problems. The solar device provides affordable and clean energy to low income households in Kenya, mobile phones make it possible to access M-Pesa. The two inventions have been designed to suit the needs of Kenyans and they *have important repercussions on peoples' lifes."*
>
> *H. Semakula (Safaricom employee) – 2016*

Mobile Phone Penetration: With 75% of the population having an active mobile handset, Kenya has a higher number of people who own mobile phones than other EAC countries (Consultative Group to Assist the Poor 2015). Of those, Safaricom accounts for about two thirds of the market (Moracyznski 2008).

Market Development Model: Kenya pursues the MNO-led model. The MNO Safaricom was the first provider who brought m-payment products to scale and continues to dominate the market (Lixing and Tao 2009).

MNO's Distribution Network (Agents): In 2009, Safaricom moved from using only its airtime dealers as agents and created the M-Pesa agent network, a hierarchical tier-structure with master agents (aggregators) and several sub-agents (Evans and Pirchio 2015). The aggregators buy large e-cash volumes from Safaricom and resell them to sub-agents in their geographical area (Evans and Pirchio 2015; Mas and Radcliffe 2010). More than 21,000 agents work all over the country – growing Safaricom's agent network at the same pace as its customer base (Communications Authority of Kenya 2015). With such a hierarchical agent structure, Safaricom only has to transact with a few agents, who in turn transact with sub-agents serving the end-customers. The sub-agents also allow for decentralized and immediate account openings. Agents generate enough business to cover their costs (Heyer and Mas 2011). Safaricom monitors the agents through site visits every other week. They forbid their agents to sell products of other MNOs. which gives them more control over their services. Recently, Safaricom introduced the 'super-agent structure', where also a bank branch can act as aggregator. According to R. Ngotwa, Kenya's former CIO of the Kenyan Communications Authority, Safaricom's Distribution network and related investments in marketing and customer relations have been a key success factors for M-Pesa.

Interoperability (enabling inter-organizational transactions): In Kenya, there are no requirements regarding inter-organizational money transfers. M-Pesa offers transfers with many banks, but rarely with other MNOs (Bourreau and Valletti 2015). As a large MNO with an extensive infrastructure and upfront investment in m-payment, Safaricom has little incentive to allow for money transfers with smaller MNOs. However, they may need some regulatory intervention. Says R. Ngotwa (former CIO of Kenyan Communications Authority):

> *"All stakeholders need to cooperate for efficiently performing m-payment services, while for now, Safaricom dictates all terms and does not pursue interoperability."*
>
> R. Ngotwa (former CIO of Kenyan Communications Authority) – 2016

Fee Structure: M-Pesa charges a fixed fee for sending up to USD 460 to any registered user.

Technology Standard: Safaricom delivers M-Pesa using the Sim Application Toolkit (STK) (Lixing and Tao 2009); an app on the SIM card can be accessed from any kind of phone.

M-PAYMENT IN RWANDA

In the following, we investigate Rwanda's dominant m-payment service Mobile Money.

Business Context

Rwanda is a densely populated and landlocked country in East Africa covering 26,000 square kilometers, thus similar to the size of Israel. The Rwandan population amounts to more than 12 million people with a growth rate of 2.6% p.a. – one of the highest in Africa. The vast majority, of the Rwandan population (85%) lives in rural areas. Rwanda has experienced significant progress in the deployment of ICT infrastructures that connect the country to global IP networks (Uwamariya et al. 2015). The existing national fiber optic backbone network links the country to

international sea cables and thus provides for affordable access to the Internet across the country. More than one third of the Rwandan population (about 3.5 million) has internet access (National Institute of Statistics of Rwanda 2015).

Of 8.2 million mobile phone subscribers in Rwanda, South African-based MTN, which has been operating in Rwanda since 1998, has the biggest market share of 49%, followed by Tigo with 35% and Airtel Rwanda with 16% (Rwanda Utilities Regulatory Authority 2015).

Concerning m-payment services, in 2014 Rwanda counted about 6.7 million m-payment subscribers across all networks (National Bank of Rwanda 2015). Yet, the significant subscriber number comes with a high inactivity rate – only 35% of m-payment accounts (2.3 million) were active in 2015 (National Bank of Rwanda 2015).

South-African based MTN is pioneer and with 50% market share also the leader in Rwanda. They offer the m-payment service 'Mobile Money' for conducting small operations such as bills for water, electricity or airtime and for transferring money to a third person's account or to the mobile banking user's account (National Bank of Rwanda 2015). Payments into bank accounts and the checking of bank balances are offered, but the number of users is still low (National Bank of Rwanda 2015). In 2015, MTN has entered a partnership with Kenya's Safaricom to facilitate cross-border money transfers.

The other two m-payment services in Rwanda are Tigo Cash, launched in 2011, and Airtel Money launched in 2013.

MTN's Mobile Money as Market Leader

In the following, we analyze what drives or hinders the provision and adoption of m-payment services in Rwanda focusing on MTN's Mobile Money.

Regulatory Setting: MTN could start its Mobile Money business upon a 'no-objection' letter from the National Bank, the institution which regulates the m-payment providers. MNOs are required to deposit customer funds in a local currency in licensed banks and they have to deposit at least RWF 200 million (about USD 0.25 million) with the National Bank to protect their aggregate deposits (Argent et al. 2013). There are no restrictions on where to invest deposits or how to use interest gained. An MTN employee explains:

> "We operators decide how to spend the amount in the interest of our clients. We thereby aim at gaining trust throughout the population."
>
> R. Tuzinde (MTN employee) - 2016

Collaboration among Stakeholders: There is no institutionalized or even imposed collaboration among the m-payment stakeholders.

Financial Infrastructure (before m-payment launch): Rwanda's large unbanked population, comprises mostly of rural residents who work as farmers and traders (Consultative Group to Assist the Poor 2015). Prior to the launch of m-payment services, they and the millions of villagers who worked in big cities had only limited means for financial transactions. They mostly uses the postal system to transfer money or send money home in cash via relatives or acquaintances.

Electricity: Despite governmental efforts to improve the infrastructure, frequent power outages make reliable m-payment services difficult for all stakeholders (Consultative Group to Assist the Poor 2015).

> "*Most of the time the connection is instable due to power cuts. The system comes back shortly afterwards, but we always lose customers because of that. […] For now, the provision of electricity [throughout the country] is highly unlikely. Over last decade, power supply has improved, but the government still has a lot to consider for creating and maintaining a good national m-payment environment."*
>
> E. Tugirimana (MTN employee) – 2016

Mobile Phone Penetration: Almost two thirds of the Rwandan population has a mobile phone (Consultative Group to Assist the Poor 2015). To further increase the mobile phone penetration especially in rural areas, the Rwanda government has slashed taxes on handsets and introduced credit schemes.

Market Development Model: Rwanda pursues primarily the MNO-led model with the South-African MNO MTN dominating the market.

MNO's Distribution Network (Agents): Regulation in Rwanda does not permit exclusivity agreements between MNOs and agents. This discourages investments in a large, high quality agent network (United Nations Committee for Development Policy 2014). Hence, in Rwanda independent agents collaborate with MNOs, but there is no hierarchical agent network with master-agents and sub-agents. MTN has distributors mainly in urban areas; rural areas are poorly covered (Consultative Group to Assist the Poor 2015).

Interoperability (enabling inter-organizational transactions): MTN's Mobile Money offers limited transactions between the MNO and banks. Transactions among MNOs are entirely excluded. This imposes high switching cost on users who intend to make business with players on different networks. However, as many incumbents, MTN is concerned about losing their investment advantage and having to pay high integration costs. Says an MTN employee:

> "Interoperability is important, but will other MNOs share our investment cost? Any integration between MNOs is rather difficult and costly. As of today, each MNO has its own system."
>
> R. Mutabazi (MTN employee) – 2016

Fee Structure: While deposits are free, MTN charges a flat fee for Mobile Money transfers and withdrawals, with transfers being generally cheaper than withdrawals.

Technology Standard: MTN's Mobile Money service uses the Unstructured Supplementary Service Data (USSD) standard, which works on the vast majority of phones without requiring changes to the existing SIM or demanding a new SIM one. To MTN, the USSD standard is the best available option to serve low-income customers today (Consultative Group to Assist the Poor 2010).

FINDINGS AND LESSONS LEARNT

Table 1 summarizes the findings from our analysis of both M-PESA and Mobile Money along the ten success factors for m-payment services in small developing countries:

Factor	M-Pesa	Mobile Money
R*egulatory Setting*	2007: Letter of 'no objection' for launching M-Pesa; 2015: Permanent regulatory framework.	2009: Letter of 'no objection' for launching Mobile Money (mainly requiring MNOs to deposit customers' funds in licensed banks); no permanent regulatory framework.
Collaboration among Stakeholders	Governmentally launched platform encouraging collaboration among participants.	No institutionalized or publicly encouraged collaboration.
Financial Infrastructure (before m-payment launch)	Large unbanked population especially in rural areas.	Large unbanked population throughout the country
Electricity	Extended coverage thanks to collaboration with energy providers.	Frequent power outages; no collaboration with energy providers.
Mobile Phone Penetration	More than 75% of the population.	More than 66% of the population.
Market Development	MNO-led model.	MNO-led model.
MNO's Distribution Network (Agents)	Safaricom selecting agents and building hierarchical structure for growing the network.	MTN's agent network barely satisfactory (agents mainly in urban areas and frequently without sufficient cash); exclusive MNO-agent relationship not permitted by regulation.
Interoperability (enabling inter-organizational transactions)	Almost unlimited transactions between MNOs and banks; limited transactions among MNOs.	Limited transactions between MNOs and banks; no transactions among MNOs.
Fee Structure	Fixed fee for sending up to USD 460 to registered users.	Fees varying with amount transferred.
Technology Standard	Sim Application Toolkit (STK).	Unstructured Supplementary Service Data (USSD).

Table 1. Summary of Comparing M-Pesa (Kenya) and Mobile Money (Rwanda)

Thereupon, we identified the following five lessons learnt regarding the potential contribution and the adoption of m-payment services in Rwanda:

(1) Firstly, adequate infrastructures are necessary for a successful m-payment roll-out and adoption in Rwanda. Such infrastructures include an appropriate telecommunication network with a high *mobile phone penetration* and sufficient *electricity* supply to make the mobile phones and the m-payment services available. To promote the former, slashing taxes on handset by the government has been a helpful first step. Regarding the provision of electricity, frequent power outages have to be avoided, if necessary also through collaborations with alternative energy providers.

(2) Concerning the *regulatory setting*, a supportive regulatory framework for m-payment services would be desirable. Regulations requiring MNOs to split their deposits across multiple banks or placing restrictions on where to invest deposits would limit a bank's risk. Hence they could foster broader m-payment adoption among all stakeholders.

(3) Furthermore, encouraging or even imposing a joined platform with participation from all stakeholders would foster the *collaboration* among telecommunications operators, payment processors, private sector enterprises as well government departments and the regulatory agency. Such policy action has been helpful in Kenya.

(4) Enabling *interoperability*, i.e. inter-organizations transactions between MNOs and / or banks would facilitate transferring money between users on different providers' networks. It would also allow users more freedom in switching financial accounts from one provider to another. This would empower customers and indirectly strengthen m-payment providers as well as the Rwandan economy as a whole.

(5) Lastly, the strongest action lever for any m-payment provider would be building an efficient *distribution network (agents)* especially in rural areas, in order to make one's services available throughout the country and reach mass-market adoption.

CONCLUSION AND OUTLOOK

Former research has shown that m-payment brings positive returns to all stakeholders in developing countries (Foster and Heeks 2013; Jack et al. 2010; Porteous 2006). Thus it should be the concern of every government to promote its nationwide diffusion and adoption. Rwanda pursues this goal as part of the 'Smart Rwanda' initiative – however with limited success so far.

In this paper, we examined the potential contribution and adoption of m-payment services in Rwanda and compared its dominant service Mobile Money to the Kenyan role model M-Pesa. Our analysis yielded several lessons learnt from which we derived the following recommendations: To policy makers, we recommend establishing a regulatory framework, promoting adequate electricity as well as telecommunication infrastructures, and requiring – almost imposing – collaboration among stakeholders. To private players such as MTN and other Rwandan m-payment providers, we put forward building a distribution network of properly incentivized agents, especially in the country's rural areas with 85% of Rwanda's population. We are convinced that doing so would help promote m-payment offerings and usage – and thereby ultimately foster Rwanda's economic and societal development and the national welfare.

REFERENCES

Aker J., Boumnijel, R., McClelland A., and Tierney N. 2013. "How Do Electronic Transfers Compare? Evidence from a Mobile Money Cash Transfer Experiment in Niger," available online www.povertyactionlab.org/sites/default/files/publications/4277_Payment%20mechanism%20and%20Anti%20Poverty_Jenny%20Aker_July2015.pdf, accessed on 16-08-02.

Argent, J., Hanson, J., and Gomez, M. 2013. "The Regulation of Mobile Money in Rwanda," available online www.theigc.org/wp-content/uploads/2014/09/Argent-Et-Al-2013-Working-Paper.pdf, accessed on 16-8-18.

Boer, R., and de Boer, T. 2009. "Mobile payments 2010, Market analysis and Overview, Innopay," available online innopay.com/assets/Reports/a6157b468508f2382a8c0fd03d422f8d.pdf, accessed on 16-8-8.

Bourreau, M. and Valletti, T. 2015. "Enabling Digital Financial Inclusion through Improvements in Competition and Interoperability: What Works and What Doesn't?," CGD Policy Paper

065, available online www.cgdev.org/sites/default/files/CGD-Policy-Paper-65-Bourreau-Valletti-Mobile-Banking.pdf, accessed on 16-7- 12.

Camner, G., Pulver, C. and Sjoeblom, E. 2009. "What Makes a Successful Mobile Money Implementation? - Learnings from M-PESA in Kenya and Tanzania," available online www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/What-makes-a-successful-mobile-money-implementation.pdf, accessed on 16-8-2.

Catia, B., and Pedro, C. 2012. "Introducing Mobile Money in Rural Mozambique: Evidence from a Field Experiment," Nova Africa Center for Business and Economic Development available online www.novasbe.unl.pt/images/novasbe/files/INOVA_Seminars/nova_sbe_batista_vicente_introducing_mobile_money_rural_mozambique_19oct2012.pdf, accessed on 16-8-12.

Coffey, A. and Atkinson, P. 1996. Making Sense of Qualitative Data: Complementary Research Strategies. Thousand Oaks, CA: Sage Publications.

Communications Authority of Kenya 2015. "Annual Report," available online www.ca.go.ke/images//downloads/PUBLICATIONS/ANNUALREPORTS/Annual%20Report%20for%20the%20Financial%20Year%202014-2015.pdf, accessed on 16-8-21.

Consultative Group to Assist the Poor 2015. "New Data Finds Mobile Money on the Cusp in Rwanda and Ghana," available online www.cgap.org/blog/new-data-finds-mobile-money-cusp-rwanda-and-ghana, accessed on 16-8-11.

Consultative Group to Assist the Poor 2010. "Mobile Money Expectation Survey," available online www.cgap.org/publications/financial-access-2010, accessed on 16-8-9.

Darren, F., Tim, W., and Wheadon, D. 2013. "Trends in Mobile Payments in Developing and Advanced Economies," Bank of Australia, available online www.rba.gov.au/publications/bulletin/2013/mar/pdf/bu-0313-8.pdf, accessed on 16-8-24.

Dayadhar R. 2015. "Financial Inclusiveness: The Role of Mobile Money and Digital Financial Services," *SOCRATES* (3:1), 95-112.

Demombynes, G., and Thegeya, A. 2012. "Kenya's Mobile Revolution and the Promise of Mobile Savings," World Bank Policy Research Working Paper, No. 5988.

Evans, D., and Pirchio, A. 2015. "An Empirical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries but Flounder in Most," University of Chicago, Coase-Sandor Institute for Law and Economics, Working Paper, No. 723.

Fengler, W. 2012. "Kenya: How Kenya Became a World Leader for Mobile Money," World Bank Blog, available online allafrica.com/stories/201207180104.html, accessed on 16-8-15.

FinAccess 2007. "Financial Access in Kenya," Results of the 2006 National Survey, available online www.fsdkenya.org/finaccess/documents/FinaccessReportFINALMain.pdf, accessed on 16-8-24.

Foster, C., and Heeks, R. 2013. "Innovation and scaling of ICT for the bottom-of-the-pyramid," *Journal of Information Technology* (28:4), 296-315.

Henkel, J. 2002. "Mobile Payment," in *Mobile Commerce*, G. Silberer, J. Wohlfahrt, and T. Wilhelm (eds.), Wiesbaden, 327-351.

Heyer, A., and Mas, I. 2011. "Fertile Grounds for Mobile Money: Towards a Framework for Analysing Enabling Environments," *Enterprise Development and Microfinance* (22:1), 30-44.

Hughes, N., and Lonie, S. 2007. "M-PESA: Mobile Money for the "Unbanked" Turning Cellphones into 24-hour Tellers in Kenya," *Innovations: Technology, Governance, Globalization* (2:1-2), 63-81.

Jack, W., Suri, T., and Townsend, R. 2010. "Monetary Theory and Electronic Money: Reflections on the Kenyan Experience," *Economic Quarterly* (96:1), 83-122.

Jack, W., and Suri, T. 2011. "Mobile Money: The Economics of M-PESA," National Bureau of Economic Research, available online www.nber.org/papers/w16721, accessed on 16-8-16.

Jane, K. 2015. "Mobile Payments and Financial Inclusion: Kenya, Brazil, and India as Case Studies," *University of Washington School of Law*, Research Paper No. 2015-29.

Kariuki, F. 2015. "Sustainability in the Financial Sector in Kenya," Kenya Bankers Association - Centre for Research on Financial Markets and Policy, Working Paper Series, WPS/01/15.

Kendall, J., Maurer, B., Machoka, P., and Veniard, C. 2011. "An Emerging Platform: From Money Transfer System to Mobile Money Ecosystem," *Innovations: Technology, Governance, Globalization* (6:4), 49-64.

Kreyer, N., Pousttchi, K., and Turkowski, K. 2002. "Mobile Payment Procedures: Scope and Characteristics," *E-Service Journal*, (2:3), 7-22.

Lixing, X. and Tao, P. 2009. "Kenya gets greener with alternative energy," available online www1.huawei.com/en/static/HW-079527.pdf, accessed on 16-7-12.

Loudon, M. 2016. "A Platform Studies Approach to the Role of Technology in the ICTD Ecosystem: The SMS in m4d Interventions," *Information Technology for Development* (22:1), 7-25.

Luarn, P., and Lin, H. 2005. "Toward an Understanding of the Behavioral Intention to Use Mobile Banking," *Computers in Human Behavior* (21:6), 873-891.

Mas, I. 2015. "Strains of Digital Money," Tufts University, available online papers.ssrn.com/sol3/papers.cfm?abstract_id=1728125, accessed on 16-8-23.

Mas, I., and Radcliffe, D. 2010. "Mobile Payments Go Viral: M-PESA in Kenya," Bill & Melinda Gates Foundations Financial Services for the Poor (FSP)-Team, available online siteresources.worldbank.org/AFRICAEXT/Resources/258643-1271798012256/M-PESA_Kenya.pdf, accessed on 16-7-21.

Mbogo, M. 2010. "The Impact of Mobile Payments on the Success and Growth of MicroBusiness: The Case of M-Pesa in Kenya," *The Journal of Language, Technology & Entrepreneurship in Africa* (2:1), 1998-1279.

Merritt, C. 2010. "Mobile Money Transfer Services: The Next Phase in the Evolution in Person-to-Person Payments," White Paper, Federal Reserve Bank of Atlanta, available online www.frbatlanta.org/-/media/Documents/rprf/rprf_resources/wp0810.pdf, accessed on 16-8-18.

Morawczynski, O. 2009. "Exploring the Usage and Impact of Transformational Mobile Financial Services: The Case of M-PESA in Kenya," *Journal of Eastern African Studies* (3:3), 509-525.

Morawczynski, O. 2008. "Surviving in the Dual System: How M-PESA is Fostering Urban-to-Rural Remittances in a Kenyan Slum," *Proceedings of the IFIP WG 2008*, pp. 110-127.

Muthiora, B. 2015. "Enabling Mobile Money Policies in Kenya : Fostering a Digital Financial Revolution," available online www.itu.int/en/ITU-T/focusgroups/dfs/Documents/2015_MMU_Enabling-Mobile-Money-Policies-in-Kenya.pdf, accessed on 16-7- 4.

National Bank of Kenya 2015. "Annual Report," available online nationalbank.co.ke/wp-content/uploads/2016/05/Annual-Report-2015.pdf, accessed on 16-8-12.

National Bank of Rwanda 2015. "Annual Report," available online www.bnr.rw/fileadmin/AllDepartment/MonetaryPolicy/upload/annualreport/BNR_Annual_Report_2015.pdf, accessed on 16-8-10.

National Institute of Statistics of Rwanda 2015. "Rwanda Population and Housing Census 2012," available online microdata.statistics.gov.rw/index.php/catalog/65, accessed on 16-8-29.

Ndiwalana, A. and Popov,O. 2008. "Mobile Payments: A Comparison between Philippine and Ugandan Contexts," available online www.ist-africa.org/Conference2008/outbox/ISTAfrica_Paper_ref_64_doc_2130.pdf, accessed on 16-8- 13.

Nuwagaba A. 2014. "Reality of Having a Cashless Society in Rwanda: Case Study-National Bank of Rwanda," *International Journal of Business and Management Invention* (3:3), 63-69.

Ondrus, J., and Pigneur, Y., 2006. "Towards a Holistic Analysis of Mobile Payments: A Multiple Perspectives Approach," *Electronic Commerce and Research Applications* (5:3), pp. 246-257.

Orlikowski, W. and Barrett, M. 2014 "Digital Innovation in Emerging Markets: a Case Study of Mobile Money," *MIT Sloan Management Center for Information Systems Research Briefings,* Cambridge, MA: MIT Sloan.

Patton, M. 2002. *Qualitative Research and Evaluation Methods* (3rd ed.), Thousand Oaks, CA: SAGE Publications.

Plyler, M., Haas, S., and Nagarajan, G. 2010. "Community Level Economic Effects of M-PESA in Kenya: Initial Findings," IRIS Center, University of Maryland, available online www.fsassessment.umd.edu/publications/effects-mpesa-kenya.html, accessed on 16-8-22.

Porteous, D. 2006. "The Enabling Environment for Mobile Banking in Africa," Department for International Development, available online bankablefrontier.com/wp-content/uploads/documents/ee.mobil_.banking.report.v3.1.pdf, accessed on 16-8-19.

Rwanda Utilities Regulatory Authority 2015. "Annual Report," available online www.rura.rw/fileadmin/docs/New.Report.Corrected.pdf, accessed on 16-6-28.

Schierz, P., Schilke, O., and Wirtz, B. 2010. "Understanding Consumer Acceptance of Mobile Payment Services: An Empirical Analysis," *Electronic Commerce Research and Applications* (9:3), 209-216.

Teo E., Fraunholz, B., and Unnithan, C. 2005. "Inhibitors and Facilitators for Mobile Payment Adoption in Australia: A Preliminary Study," *Proceedings of the International Conference on Mobile Payments*, Los Alamitos, CA, USA, 663-666.

United Nations Committee for Development Policy 2014. "Needs Assessment of the Millennium Development," available online www.acdicida.gc.ca/INET/IMAGES.NSF/vLUImages/MDGpdf/$file/MDG-3E.pdf, accessed on 16-8-19.

Uwamariya, M., Cremer, S., and Loebbecke, C. 2015. "ICT for Economic Development in Rwanda: Fostering E-Commerce Adoption in Tourism SMEs," *Proceedings of the SIG GlobalDev Eighth Annual Workshop*, Fort Worth, TX, USA, Paper No. 1.

Vong, J., Fang, J., and Insu, S. 2012. "Delivering Financial Services Through Mobile Phone Technology: A Pilot Study on Impact of Mobile Money Service on Micro-Entrepreneurs in Rural Cambodia," *International Journal of Information Systems and Change Management* (6:2), 177-186.

Wang, S., Wang, M., Lin, H., and Tang T. 2003. "Determinants of User Acceptance of Internet Banking: An Empirical Study," *International Journal of Service Industry Management* (14:5), 501-519.