# Effects of mobile money usage on rural consumers' livelihoods in Zimbabwe

Thulani Dube and Bibi Zaheenah Chummun $^{*}$ 

University of KwaZulu-Natal, South Africa. \* Corresponding author email: ChummunB@ukzn.ac.za

#### Abstract

Mobile financial services have posed as a potential remedy to the financial inclusion challenge for disadvantaged communities. This study demonstrates how mobile money service usage impacts on the livelihoods of rural consumers in Zimbabwe. Out of a population of all rural households using mobile money. The study is based on a survey of 351 household heads selected from the Kwekwe rural district, using a multi-stage random sampling approach. We employ structural equation modelling technique in two stages, where the first step entails the estimation of the measurement model through confirmatory factor analysis and the second step involve estimation of the structural model by examining the structural relations as hypothesised in the model. Both the measurement model and proposed structural model fit the data satisfactorily, thus providing a basis to conclude on the study hypotheses. Most of the relationships in the structural model are found to be statistically significant at 95% confidence interval. Overall, the study concludes that mobile money has potential positive impacts on the rural livelihoods as demonstrated by the positive effects of the factors in the structural model. The study provides evidence on how mobile financial services impact on rural livelihoods. Therefore, policymakers can craft policies (financial inclusion) that will promote and improve access and delivery of financial services to the rural people especially with the savings and provision of credit through mobile money.

Keywords: mobile money; wellbeing; structural model.

Dube and Chummun: Effects of mobile money usage on rural customers' livelihoods in Zimbabwe

#### 1. Introduction

It has been noted that even "well-developed" financial systems have not succeeded to be 'all-inclusive' and certain segments of the population remain outside of the formal financial services" (Sarma and Pais, 2011). An inclusive financial system has many benefits to an economy as it facilitates efficient allocation of productive resources and can significantly improve the individual's management of financial resources. In most developing countries, financial services are characterised by financial exclusion; for example, there is over-reliance on informal methods of funds transfer and sources of credit. The development of an inclusive financial system reduces the growth of informal sources of finance as these tend to thrive in financially exclusive economies and they are often very exploitative (Sarma, 2008, Sarma and Pais, 2011). The importance of an inclusive financial system has been widely underscored, making it a policy agenda by many developing countries. As a result, it has drawn attention from many players, including financial regulators, governments, telecommunications and development agents, among others. The focus has been to provide access to financially marginalised groups like rural communities.

In the context of limited banking facilities for the totality of the world's rural populations, the critical financial predicaments pointed out by financial institutions, as indicated by research, have revolved around the initial cost of setting up the requisite infrastructure; costs associated with the operation of financial institutions; and the low likelihood of realizing reasonable profitability, if any, from providing services to these customers, due to the low levels of disposable incomes of this demographic group (Alexandre, Mas and Radcliffe, 2011, Dermish, Kneiding, Leishman and Mas, 2012, Goss, Mas, Radcliffe and Stark, 2011, Alleman and Rappoport, 2010, Mas, 2010b). In Southern African countries like Zimbabwe, such rural communities rely, for subsistence, on small-scale farming, which has very little surplus from which income is generated.

Mobile Network Operators (MNOs) have expanded their network coverage in the last couple of years, with the availability of ever-cheaper mobile phones having consequently improved mobile phone penetration throughout the rural communities of Zimbabwe. The higher levels of mobile phone distribution and the resultant mobile money service usage has circumvented the brick and mortar banking infrastructural requirements in developing countries (Oluwatayo, 2013, Alexandre *et al.*, 2011, Flores-Roux and Mariscal, 2010, Jack and Suri, 2011, De Sousa, 2010). The benefits of mobile communication networks include the enablement of free flow of information; real-time delivery of mobile communication messages; facilitation of more efficiency in markets, hence developing entrepreneurs. The preceding consequently leads to financial innovation, allowing the use of mobile phones as conduits by which previously unbanked, and therefore financially excluded rural communities may have efficient access to financial services.

The innovations in mobile money have made it possible for users to access their bank accounts using their mobile phones without having to physically visit their bank branches, a pulling factor that more and more of the banked population can no longer afford to resist any more in Zimbabwe. Furthermore, this has been made possible by the partnership between MNOs and banks, effectively roping in the traditional banking system into mobile money services. Many low-income earning people save and transfer money using informal networks like saving money under the mattress and using friends and relatives and sending money through bus drivers, but these have high transaction costs and are prone to theft, fraud and other risks. Mobile money is beginning to fill this gap by offering financial services over mobile phones, from simple personto-person, business-to-business transfers to more complex banking services. Only a handful of these deployments have reached a sustainable scale; a notable example is the success story of M-Pesa in Kenya, was launched in March 2007 by Safaricom. According to Suri, Jack and Stoker (2012), M-PESA users are always at an advantage whenever there are challenges. For instance, when there are cash shortages, the users can rely on the money in their wallet to use online payment without the need to handle cash. The adoption of this innovation was expected to raise financial inclusion especially at the lower end of the social spectrum, which has suffered financial exclusion for a very long time while reducing the cost of access and use of essential financial services.

There are few studies that have been carried out worldwide on mobile financial services targeting the effects this innovation has on the underprivileged communities particularly in sub-Saharan Africa. The studies reveal that the uptake and use of mobile financial services have enhanced financial inclusion and consequently reduced levels of poverty among rural households (Must and Ludewig, 2010). Some of these studies reveal that mobile money has proved to be a scalable method to provide financial services in developing countries, with data from several African countries, including the work of Must and Ludewig (2010) validating this argument. Several reasons have contributed to this state including easier and more affordable ways to send remittances, increasing the reach and affordability of micro-loans, decreasing costs of savings among other services that are required by SMEs. The Zimbabwean rural communities are faced with many challenges, ranging from financial exclusion, liquidity challenges as well as high levels of poverty. For instance, starting in 2016, the economy was confronted with and continues to experience severe liquidity challenges (cash shortages). The challenges have made it impossible even for the banked population to access cash, consequently forcing the population to rely on digital money (mobile money). The crisis has led to overwhelming adoption of mobile money services both in urban and rural communities, transforming some existing community based saving and credit practices (*mukando* and *maround*).<sup>1</sup>

Therefore, mobile money usage presents some opportunities to improve the livelihood of rural consumers who are most affected by financial exclusion challenge. However, in Zimbabwe, there are no studies that have been undertaken to empirically verify these assertions. The current study, therefore, sought to develop a structural model on the impacts of mobile money on rural consumers. Structural equation modelling was chosen for a number reasons. Among them is the capability for SEM to deal with latent variables or factors underlying observed variable. Also, the ability of SEM to deal with multiple relationships simultaneously among variables contributed to the choice of the approach (Kroehne, Funk and Steyer, 2003).

## 2. Literature review

## 2.1. Mobile money

Mobile money is simply the provision of financial services to people using a mobile phone (Donovan, 2012; Gencer, 2011; Jenkins, 2008). Anyasi and Otubu (2009) define mobile money services as encompassing a broad array of financial services which may be accessed by customers via the mobile phone device. All one needs to be financially included in the era of mobile money is a mobile device and access to a mobile money agent. When registered and one begins transacting, mobile money is characterized by the following features: balance inquiries, depositing and withdrawal of cash (cash-in and cash -out) respectively; transfer of fund; savings; access to lines of credit; off-shore remittances; payments of bill; and purchase of airtime (Kasseeah and Tandrayen-Ragoobur, 2012, Donner and Tellez, 2008, Jenkins, 2008). In the assessment of unorthodox

<sup>&</sup>lt;sup>1</sup> *Mukando* and *Maround* are these informally organised groups where group members agree to contribute fixed amounts of money on a monthly basis. The money could be borrowed at an agreed interest rate per month. The interest rate can be relatively low for members but exorbitant to non-members.

banking services, Kumbhar (2011) identified the fulfilment of services and the availability of systems as the indicators that explain the range of service that the operator may avail and to what extent they are being used. The inclusiveness of the financial system can be evaluated based on the following indicators: risk minimization, speed of service, ease of use, innovativeness, cost effectiveness, responsiveness, customer education and credit counselling (Kumbhar, 2011). The distance walked to access the service is also a significant determinant in assessing the effectiveness and inclusiveness of the service. Literature abounds on mobile money ecosystem, models, processes and developments but few studies have been undertaken to link mobile money usage and welfare especially in rural communities. Therefore, making the current study unique in that through a structural model, tries to fill the gap in the Zimbabwean context. The following section presents the effects of mobile money usage on welfare.

## 2.2. Impact of mobile money

To assess the impact of mobile money usage on the well-being of rural households, the study used a theoretical framework developed by Alampay et al (2017) to develop a structural model. The theory of change was applied on existing empirical studies by Alampay et al (2017) when designing a theoretical framework on the impact of mobile financial services on low and low-middle income countries. Vogel (2012) defines the theory of change as a description of a series of events expected to culminate in or yield desired results. While Valters (2015) asserts that the theory of change as a continuous process of reflection and consideration to examine change and how it occurs. It is employed to offer explanations and justification and how things are intended to work, to chart new possibilities through critical thinking, discussion, and challenging prevalent narratives. Taplin, Clark, Collins and Colby (2013) are not oblivious of the fact that the theory of change provides a working model against which to put to the test hypotheses and assumptions about the suitable strategy to facilitate an intended outcome. A graphical representation of the results can be made through pathways showing a connected causal chain of impacts. According to Vogel (2012), the theory of change thinking can be a means first to illuminate impact pathways in operational contexts and secondly to link activities to changes at different levels (community, sub-national, national and international).

Dube and Chummun: Effects of mobile money usage on rural customers' livelihoods in Zimbabwe

CONTEXT Intermediate Intervention Socio-economic development impact outcomes Macro Micro Livelihoods Financial Efficiencies inclusion Knowledge of Savings Economic M-financial services Adoption / Consumption growth services use patterns International Social capital/ and domestic power relations remittances Financial and social inclusion

FIGURE 1: THEORETICAL FRAMEWORK

Source: Alampay, Moshi, Ghosh, Peralta and Harshanti (2017).

In this theoretical framework Alampay *et al.* (2017) espouse that mobile financial service intervention on the financial services needs of the low and low-middle income countries has significant gains to a country's development, that is, the use of mobile money can result in immediate outcomes to low-income groups. They anticipated that long-term impacts can be observed at micro-and macro-levels, where micro-level implications can be observed on livelihood efficiencies, savings, and changes in consumption, social capital/power relations as well as financial and social inclusion. On the other hand, macro-level impact includes economic development; remittances (both domestic and international); and financial inclusion. The present study differs from the work of Alampay *et al.* (2017) in scope and focus. It focuses on the micro-level, that is, rural communities (Zimbabwean) in a different economic, social and cultural environments while Alampay *et al.* (2017) focus on both micro and macro level at country level.

Consequently, it might not reflect the real impacts on rural people as they use aggregate data. The next section weighs the impact of mobile money by identifying, exploring the study variables and reviewing the empirical evidence in relation to the variables. Duncombe and Boateng (2009) revealed the paucity of researches that have been done so far to assess the effects of phone-based financial services. This is premised on the fact that a significant number of mobile money services developments were still unripe and only beginning to take shape to warrant rigorous empirical research. Kumbhar (2011) identified several pointers, which are applicable in evaluating unorthodox financial products as ways of establishing the inclusion of unbanked population. The indicators identified by Kumbhar (2011) ranged from qualitative through quantitative to mobile money effects. The effects in general encompassed the extent of indebtedness; change in savings culture; change in the level of income; transformation economic well-being of the users of the mobile money service; and a change in banking practices in general. The scrutiny of previous research on the effects of mobile financial services revealed a positive correlation among savings, communication, positive changes on income, reduction on costs, improved productivity, and improvements on remittances (Dermish *et al.*, 2012, Demombynes and Thegeya, 2012, Jack and Suri, 2011, Mbiti and Weil, 2016, Morawczynski and Pickens, 2009). The above highlighted effects are further elaborated in the subsections that follow below.

## 2.1.1. Communication

According to Kaul (2011), the communication process, if amply and effectively used, can create room for millions of people in developing countries to improve themselves using individual efforts, from the web of disease, poverty and ignorance to one of economic, social and moral well-being. This owes to the fact that the sharing of knowledge about all developmental processes in a community is indebted to communication. Mobile money is the service provided by mobile network operators, and the service is used mostly by those who own cell phones. Being in possession of a phone entails widened avenues to such as easy and affordable communication services, and access to information on just about everything (Ryder, 2014). The dawn of mobile technology and ICTs has made great strides towards the accessibility and affordability of information and communication worldwide, particularly in the third world countries(Aker and Mbiti, 2010, Aker, 2010). This could be why Diga (2008) asserts that the recent inception of mobile phone telephony in rural Uganda wrought great change to its citizens. A wave of recent studies have come to the realization that cell phone use in communication increases economic activity coupled with facilitating social development by increasing access to and facilitating information dissemination, improved productivity and facilitation of social networking (Jain, Hong and Pankanti, 2008).

The use of mobile phones involves handling communication activities, rendering it an essential tool for promoting agricultural and livelihoods of the rural people, consequently promoting social and economic development (Hudson, 2013). "Mobile communication also promotes social networking, thereby enhancing social capital which is one of the five capital assets of the livelihood 426

sustainable framework. Means of achieving this encompasses enabled contact with family members, friends and social groups without the need to meet face to face (Jain *et al.*, 2008). The double benefit is reduction in transport cost and promotion of social cohesion for developmental cause as noted by Goodman (2005). Bhavnani, Chiu, Janakiram, Silarszky and Bhatia (2008) identified three types of social capital facilitated by the use of mobile phones. They allow the creation of close linkages among the members of the family, friends and the wider community members. They also promote links with economic agents like tradesman government officials and business people at large. Moreover, mobile phones foster effective and efficient communication among small groups, by providing room to keep in touch in crises and ensure availability of aid at the earliest possible time (Jain *et al.*, 2008). Mobile communication facilitates the spreading of different kinds of information ranging from educational, health, and agricultural information.

Mobile phones are also linked to the creation of opportunities in the agricultural sector and the promotion of rural development as advanced by Baumüller (2012). Mobile phones remain the leading tool among many for dissemination and collecting information on agriculture technologies, yields and prices in developing countries (Aker, 2010). Furthermore, Dolan (2009) makes a distinction between the various function of mobile phones. In the agricultural sector, it can be used to mediate on agricultural extension services where farmers can receive expert farming advice via mobile phones. Advice can range from handling planting, to information relating best farming practices. Farmers can also receive information on changing weather patterns that can have adverse effects on their crops or animals via the mobile phone. Therefore, the use of mobile phones can eliminate the need for physical contacts where it is not necessary.

Dolan (2009) noted the use of mobile phones in accessing markets where farmers can market their produce through mobile phones by sending information to buyers about their produce. This information can be shared in the form of videos or text messages consequently inducing sales. Customers can make orders through the mobile phone and then conclude transactions when money transfers are done through the mobile money service. A service that has actually transformed the payment process for rural farmers and this has direct livelihood effect. According to Mittal and Mehar (2012), farmers revealed that initially mobile phones were used for social communication but had eventually extended

their use to communicate business-related issues with traders and other farmers on relevant information such as input availability or market prices.

To buttress the benefits identified made by Dolan (2009), Mittal and Mehar (2012) add another benefit of using mobile phones for agricultural activities as enhanced access to information related to seed variety. This can be advice from seed producers to their clients. Their survey indicated that about 34, 63% of farmers realised an increase in yields due to the availability and costeffectiveness of referred information. Masuki, Kamugisha, Mowo, Tanui, Tukahirwa, Mogoi and Adera (2010) show that most of the farmers use phones to contact suppliers, technocrats and traders to confirm on different issues about farming and market. Animal husbandry farmers and veterinarians have found perpetual communication with the help of mobile phones (Martin, 2010). In a study Martin (2010) confirmed that livestock farmers were attributing the improved livestock production and quality to the adoption of cellular phones in communicating and consulting the veterinary and agriculture experts without physically travelling to their offices. The use of mobile phone in scanning for a lucrative market had potentially ensured the real tradable quantities of agricultural produce and mobilised farmers to bulk their produce and sell as a group thus built social capital among farmers within the village" (Masuki et al., 2010). Studies by De Silva and Ratnadiwakara (2008), Ashraf, Giné and Karlan (2006) assert that cell phones can be great drivers of international trade in the agricultural sector.

## 2.1.2. Remittances

Remittance flows from the international and internal migrants have been facilitated by mobile money. Remittances are funds and goods transmitted by international and internal migrants to their families and communities (Garip, 2011). According Global Migration Group (2014) remittances generally represent a portion of migrants' private earnings or income sent to support families in origin communities. Remittances can be sent by individuals and/ or a group of people that is collective remittances (López, Escala-Rabadan and Hinojosa-Ojeda, 2001). Globally, according to the World Bank (2011), data remittance flows reached US\$ 483 billion in 2011 and was expected to rise to US\$ 593 billion by 2014. In developing countries, they were US\$ 359 billion in 2011, an increase of 8 per cent over 2010, and were expected to reach US\$441 in 2014. Generally, remittances increasingly contribute the bulk of foreign currency and development finance (Orozco and Lindley, 2007; López *et al.*, 2001). Lack of proper travel documentation by many Zimbabwean emigrants, as

a result of dreadful economic situation which has forced them to cross borders, meant that a significant flow of remittances come in through informal channels (Zhou, Pindiriri and Tambama, 2013). Hence, Orozco and Lindley (2007) think that remittances that came into Zimbabwe through informal and formal channel were about US\$1, 3 billion annually.

Ongoing debates on the effects of the remittances persist, on the one hand the prophets of doom scholars argue that remittances disrupt agricultural production in the communities that had lost economic active group due to labour migration (Ncube and Gómez, 2011). While on the other hand, the other group maintains that remittances improve the welfare of the recipients through improved consumption, income and financing of rural livelihoods such as agriculture (crop production and poultry). The pessimistic scholars view remittances simple as a mere compensation of the loss labour in the expense of domestic production. Since remittances result from labour migration, they base their arguments on the basis of loss labour from the sending communities or households and thus affecting agriculture production. They argue that if the sending communities or households are poorest, then the loss of the economically active group due to migration increases their poverty.

In contrast, the pessimistic scholars on remittances, view migration as part of an overall family strategy to raise income, obtain funds for investment and insure against risk (Maphosa, 2007). The pessimists further posit that remittances loosen production and investment constraints, setting in motion a development dynamic in poor rural environments. The basis of their argument is that the loss of population to migration raises the average incomes of those left behind and remittances may raise income to further investment in rural households."

Most studies on remittances have shown that monetary remittances are largely used for consumption and less for investment. Orozco and Lindley (2007) state that in Zimbabwe about 58% of the remittances money is used to support family, 4% to build homes, 3% to invest in business and 2% to support friends. Most remittances are directed towards consumption in Zimbabwe because of the dire political and economic crises that have characterised the nation since the new millennium. As such remittances sustained the consumption levels of the people especially in rural communities. Ghosh (2006) notes that increased household consumption in the form of expenditure on health, education and family welfare contributes to human welfare and capital development at the community level. Ncube and Gómez (2011) posit that in many developing countries facing low rate of domestic savings and high government expenditure, remittances and other

external financial source play a critical part in local development and poverty alleviation strategies. Durand, Kandel, Parrado and Massey (1996) noted that remittances were instrumental in the development of a village in the Philippines in terms of improving agriculture productivity by providing both sources of capital for cash crop production and a means to acquire land. Maphosa (2007) further notes that remittances sent back to the family find use in building or improving houses, buying land livestock and durable consumer goods such as household furniture. Internal remittances are the remittances that flow within the borders of the country. Common in developing countries is the trend that economically active age groups migrate from rural to urban areas in search of jobs and livelihood and remit part of their income back to their families and communities. The flow of internal remittances has been made efficient (Jacob, 2014) due to the introduction of mobile money (Safaricom) in Kenya, (MTN Mobile wallet) in Ghana, ECOCASH, One Wallet, and Tele cash) in Zimbabwe.

## 2.1.3. Productivity

Productivity is commonly defined as a ratio between the volume of output and the volume of inputs. The efficiencies of production inputs, such as labour and capital, are being used in an economy to produce a given level of output and it is this that productivity measures. Productivity is considered a key source of economic growth and competitiveness and as such it informs about the economical performances of the economy (Krughman, 1994). According to Gordon, Zhao and Gretton (2015), productivity to some people come from working harder and longer (unpaid) hours to others, it is a return from investing more in capital (such as infrastructure and education). Gordon *et al.* (2015), further alludes that productivity grows when output grows faster than input, which makes the existing inputs more productively efficient. Productivity does not reflect how much we value the outputs; it measures how efficiently we use our resources to produce them. Putting aside the problem of ensuring production of what we want to consume, productivity growth is a good way of improving living standards.

Agricultural production and other rural livelihoods are the standard measurements of productivity in rural areas in developing countries. "Literature on rural productivity focuses more on agriculture, fishery and small-scale mining as key drivers of the rural economy. Mobile money has increased agricultural productivity through enhanced ability to send and receive payment, reduced risk in transferring funds for farmers (Sife, Kiondo and Lyimo-Macha, 2010).

In establishing the impact of mobile money transfer service in smallholder agriculture productivity, Kirui, Okello, Nyikal and Njiraini (2013) found that mobile money improved rural livelihoods productivity, particularly on smallholder agriculture.

As observed above, mobile money facilitates the sending and receiving of remittances and cash as wages, the use of these remittances and cash augments agricultural productivity (Ncube and Gómez, 2011). It has been revealed in studies by Ncube and Gómez (2011) and Maphosa (2007) that households in rural areas use remittances to purchase agricultural equipment's and other productive assets and also to finance other rural economic activities to improve their productivity, hence reducing poverty. Productivity is also enhanced in mobile money users through communication and dissemination of information that matters to farmers over farming issues through use of mobile phones. Sife et al. (2010) noted that the adoption and use of cellular in agricultural activities resulted in the reduction of costs associated with conducting business as well as increased production. Moreover mobile phones assisted rural farmers, traders, and entrepreneurs to access better markets, consequently yielding better prices for their products and services. Jacob (2014) found that women users of mobile money had more access to agriculture inputs and machinery as a result of mobile money, as they can purchase or get farm inputs more easily via mobile. This was easy as they could order right from the farm and pay pending delivery, these then necessitated continuity of workflow (Jacob, 2014).

According to Kirui *et al.* (2013), mobile money has a rewarding effect on agriculture productivity by virtue of increasing the level of household agriculture commercialisation, household agriculture income and household input use. "This scenario opens vast opportunities in rural poverty reduction and increases agricultural production and food security in rural communities. Nagarajan and Haas (2011) indicated that mobile money (M-PESA) transfers help enhance food security by facilitating time-sensitive money transfers, spreading risks across geographical regions, making users creditworthy, and by improving domestic production, access and consumption of diversified foods among the households that receive money through mobile money. Jacob (2014) also states that mobile money transactions are important to women farmers who use mobile phones and most of them carry their agriculture business with mobile phones as a tool to get business deals as well as a bank to receive, send and keep money. Increased productivity in rural households and or communities through

the use of mobile money entails somewhat improved economic well-being in rural communities.

## 2.1.4. Savings

Mobile money technology has high chances for the betterment of savings mechanisms of rural people, especially where appropriate banking systems are inaccessible and unaffordable for the majority in developing countries. That part of the income that is not spent on current expenditure becomes the savings and is usually reserved for unforeseen circumstances or emergencies because the person does not know what will happen in the future (Demombynes and Thegeya, 2012, Mbiti and Weil, 2011). Barnett and Block (2007) defined savings as to prepare for the future that is to arrange for the future consumption that is expected to be greater than otherwise would have been the case, though the specifics of the future consumption are not necessarily predetermined. Economists define savings as income minus consumption; that is a person decides to forego consumption (Samuelson and Nordhaus, 1985) and spare some income for future use or invest in houses, real estate, bonds shares and other financial instruments (Piana, 2003). Basically, all these definitions agree that savings are simply the setting aside of some income for future use, for consumption and or investment. Mobile money can serve as a safe and more appropriate mechanism for saving in rural areas to enhance financial inclusion (Chummun and Ojah, 2016). Savings mobilization is critical for individual and societal welfare (Morawczynski and Pickens, 2009). According to Ky, Rugemintwari and Sauviat (2016), savings help individuals to smoothen consumption and to raise funds for their businesses. Thus, savings give a base for future investments and financing of livelihoods in rural people.

The limited access of poor people to formal financial institutions in many developing countries leads to individuals, households or group of people to come together informally to build up a savings network (Ky *et al.*, 2016). "The informal methods of rural saving comprise of the following mechanisms: saving through buying livestock as a way of storing value; using home facilities to store money for example 'under the mattress' is one such approach; and giving money to a neighbour or a trusted friend for safekeeping. The other approach that is organized and more appealing is the group saving scheme called internal savings and lending schemes (ISALs), or rotating savings and credit associations (ROSCO) (Ryder, 2014, Morawczynski and Pickens, 2009, Ky *et al.*, 2016). These informal mechanisms of saving are risky, inappropriate and incomplete because they are subject to theft and another mischief that might arise. Such

insecure mechanisms of saving stem from the fact that low-income population and rural folk have limited or no access to formal structures, they are deprived of access to formal savings facilities especially banks (Ryder, 2014).

Evidence suggests that the marginalized save within their means in those stringent and hard conditions (Karlan, Ratan and Zinman, 2014). Banerjee and Duflo (2007) carried out a household survey in Kenya and found that the poor do have some surplus they use for non-essential expenditure. It is these nonessential expenditures that should be harnessed by a safe, affordable, accessible and appropriate mechanism of saving so as to leverage household investment and eventually reducing the levels of poverty among the rural households. Beck, Demirgüc-Kunt and Honohan (2009) noted that in general poor and rural people also need proper ways of saving, payment systems and insurance cover. The use of mobile money can be a panacea to lack of a safe, accessible and affordable mechanism in rural areas and promote household financial savings. This growth in financial innovation in using mobile phones as a digital wallet allows individuals do basic money transfer services through cash-in and cashout functions (Ky et al., 2016). Mobile phones offer a special opportunity for integrating savings, payment and budgeting tools without limits for the client (Mas and Mayer, 2011)." According to Morawczynski and Pickens (2009), there is evidence that although M-Pesa was designed as a money transfer service, it is also used for savings. A study funded by FSD-Kenya states that over 3000 households in Kenya revealed that users were storing money in M-Pesa. Storing money in the mobile phone presents people with an insured (secured) method. Mobile money service preserves money from thieves and unplanned expenditures due to service fees charged on withdrawal transactions as a result it encourages mobile money users to withdraw their money only when an important need emerge (Ky et al., 2016). In the mobile money system depositing (cash in) is free to registered clients while withdrawal cash out is taxed a certain percentage. It is that cash out tax that discourages the users to unnecessarily withdraw their money.

Two types of mobile financial servings have been identified by Demombynes and Thegeya (2012) namely: *Basic mobile savings* - It refers to the mobile money facility that allows the user to store funds that are interest-free. *Bank integrated mobile savings* - is defined as a mobile financial service that is linked to a bank account and might pay interest and creates chances for the user to access loans and insurance. The bank integrated mobile savings can further be divided into two categories according to the agreed relationship between the bank and mobile operator. These are partially integrated and fully integrated mobile savings. In partially integrated mobile savings, the customer is required to first open a bank account at a physical bank, allowing the users to access bank services through the phone. While in a fully unified mobile savings scheme the customer is not required to open a bank account. The customer registers for services through the mobile money service provider in order to access financial services. It is a result of a joint venture between the bank and the service provider. The elementary cellular savings scheme and the fully unified mobile savings scheme are the typical mobile money savings that suit the needs of the rural poor because it does not require them to visit the bank to open an account first (Demombynes and Thegeya, 2012). Ky *et al.* (2016) noted that savings form part of key financial services that can help the poor people to manage vulnerabilities and build asset base.

Many studies revealed that the growth of mobile money services has allowed the financially excluded to keep their small amounts in their safe and secure digital wallet. Chummun (2019) alluded that mobile security can enhance financial inclusion. Morawczynski (2009) indicated that M-Pesa complimented household savings mechanism. In the same study, it is noted that the mobile money service has afforded users the ability to store their money separately, that is, personal savings and business savings. However, Demombynes and Thegeya (2012) found that M-Pesa's usage increases savings as a simple storage device for the safe keeping of excess funds. Such stored funds would thereby be shielded from the perils of theft unwelcome accessibility to the funds by relatives. Despite being just a secure place to store funds mobile money as highlighted in Morawczynski (2009), allows for the accumulation of the savings for financing of the small income-generating projects such as poultry. Ky et al. (2016) postulate that if the poor individuals had good savings tool such as mobile money reliably available, safe and accessible, they would be able to manage well their money and overcome unpredictable and predictable shocks. Therefore, mobile money savings present a potential pathway to poverty reduction in rural areas.

## 2.1.5. Economic well-being

No universal definition of economic well-being is in place but the concept is frequently perceived as representing the stock of assets/wealth used to generate well-being (Durand and Smith, 2013). According to Canberra Group (2011), households' economic well-being can be expressed in terms of its access to goods and services. To that effect, if a household can consume more, it becomes

a sign of its economic wellbeing (Durand and Smith, 2013). Stiglitz, Sen and Fitoussi (2009) emphasized a shift from the traditional system that focuses on economic production the Gross Domestic Product (GDP) to measure people's wellbeing. Stiglitz et al. (2009) alluded that although various dimensions to well-being exist, the starting point should be the measurement of material wellbeing or living standards. The GDP mainly measures market production and it has been often treated as if it were measure of economic well-being(Stiglitz et al., 2009). They validate the line of thought by pointing out that conflating economic well-being and GDP can lead to misleading indications about how well-off people are and consequently wrong policy directions. Pender, Marré and Reeder (2011) stated that policy formulation can be seriously affected when income or consumption are used as indicators of well-being without also considering wealth. Wolff and Zacharias (2009) added wealth to represent another dimension of well-being besides income and consumption. Cementing the idea of accommodating the three dimensions in measuring economic wellbeing (Short, 2014) emphasized that a one-dimensional focus of economic well-being is likely to present an incomplete picture of the economic well-being of individuals and households.

Material living standards are better followed through measures of household income and consumption (Stiglitz et al., 2009). Wolff and Zacharias (2009) opine that a convenient measure of income from wealth is a part of the wider agenda for the betterment of household economic well-being. The argument by Wolff and Zacharias (2009) brings in the idea that wealth and income are interconnected and can be used interchangeably hence validating that income and wealth are almost interchangeable as measures of household well-being (Wolff and Zacharias, 2009). That is to say, popular belief has it that families with high income more often than not are wealthy while families with low incomes are regarded as poor or less wealthy. This reflects a generally positive relationship between wealth and income (Radner and Vaughan, 1987). Pender et al. (2011) reveal another interrelationship between the variables income and wealth, where income can be used to enhance household's wealth, for example, if income is less than consumption it implies that a household may need to draw the net difference from its reserved stock of wealth. According to Pender et al. (2011) net savings in general is represented as the difference between consumption and income where, if the difference is positive then wealth is likely to increase over time and on the other hand it is depleted if the difference is negative (Pender et al., 2011). Wolff, Zacharias and Caner (2004) concur with Stiglitz *et al.* (2009) that when measuring household wellbeing it is necessary to factor other components besides wealth and money, to include other measures that incorporate the value of production as well (Wolff *et al.*, 2004).

To fully understand the extent of household well-being, it is important to evaluate various aspects of the household's economic status. This entails assessing changes in the household's wealth and consumption (Durand and Smith, 2013). While other studies focused on one determinant of economic wellbeing, this current study measures household well-being through consumption and wealth as used in the OECD Framework (Durand and Smith, 2013). The scope of the research is that through use of mobile money in rural communities' livelihoods are promoted and improved which ultimately enhance economic well-being among the communities. The flow of cash as remittances, wages and salaries and income from livelihoods through mobile money is affecting the user welfare either way. In this case economic wellbeing is measured by material living standards (wealth) so as to capture the household economic well-being. The study, therefore, makes the following hypotheses:

 $H_{l}$ : Usage of mobile money has a positive effect on remittances of the rural households.

 $H_2$ : Mobile money remittances have a positive effect on productivity of the rural households.

 $H_3$ : Remittances have positive effect on consumption of rural households.

 $H_4$ : Mobile phone usage in communication has a positive effect on the savings of rural households.

 $H_{s}$ : Mobile phone usage in communication has a positive impact on the productivity of rural households.

*H*<sub>6</sub>: *Productivity has a positive effect on wellbeing (wealth) of rural households.* 

 $H_{\tau}$ : Savings has a positive effect on wellbeing (wealth) of rural households.

# 2.2. Proposed conceptual model

Using the above-discussed effects factors that affect the livelihood strategies of rural people and the possibility of providing financial services to the poor through mobile phones, the formulation of a structural model was undertaken. The model involves emission paths to four reflective constructs, communication, remittances, productivity and savings all impacting on economic well-being as indicated in Figure 2.

Dube and Chummun: Effects of mobile money usage on rural customers' livelihoods in Zimbabwe



FIGURE 2: PROPOSED STRUCTURAL MODEL

#### Source: Developed by Authors

Figure 2 shows a proposed model that suggests that usage of mobile money leads to improved economic well-being of rural people through better communication, improved remittances and enhanced savings. Economic wellbeing that depends on mobile money usage while mediated by constructs, remittances, productivity, savings is an endogenous variable.

#### 3. Methodology

The study used a mixed-methods explanatory research design to determine the effects of mobile money usage on the wellbeing of rural people. The methodology was chosen due its simplicity and straightforwardness (Williams, 2007, Ivankova, Creswell and Stick, 2006). More weight was given to the quantitative approach guided by research interest and the purpose of the study which focused on SEM (Ivankova et al., 2006). The population comprised of households that use mobile money in Kwekwe rural district in the Midlands Province. The household was defined as a group of individuals staying together as a family, the relation being either by blood or marriage (ZimStat, 2013). The selected districts have twenty-two wards with a total of 34945 households and an average size of 5 individuals per household. Therefore the target population for the study was 8258 households drawn from the sampled six wards in Kwekwe rural district. To achieve an appropriate statistical power for a proposed model, it was important to determine the sample size for the study (Hoe, 2008). The recommended sample size for structural equation modelling ranges between 200 and 400 respondents (Bagozzi and Yi, 2012, Kline, 2012, Hair, Black, Babin, Anderson and Tatham, 1998, Iacobucci, 2010, Lei and Wu, 2007). Therefore the

study used a sample size of 367 respondents. The sample size was calculated using the formula developed by Krejcie and Morgan  $(1970)^2$  for determining the sample size.

## 3.1. Sampling procedure

A multi-stage stratified random sampling technique was employed in selecting research respondents. Mathers, Fox & Hunn (1998) maintained that multistage designs are used on household surveys to reduce costs. They were four sampling stages used in choosing the research respondents. Stage one involved the selection of a single district from eight rural districts in the Midlands Province. Kwekwe district was chosen using simple random technique. Stage two involved the sampling of six wards from a total of twenty-two wards in Kwekwe rural district using a simple random sampling technique. Stage three involved sampling of four villages, where each ward has an average of twelve villages. The villages provided administrative convenience and flexibility for stratification (Mathers et al. 1998). Overall, twenty-four villages were selected from the six wards (Ward 10, Ward 11, Ward 13, Ward 15, Ward 16 and Ward 21). Stage four involved the selection of the fifteen household heads per village as the optimum number supported by Cochran (1977) for household sampling. Using a sampling procedure known as the probability-proportional-to-estimated size (PPES) sampling, a fixed number of household heads per village was systematically chosen.

## 3.2. Instrument

The research instrument used for this study was a questionnaire. Questions on mobile money access and usage elicited information on previous access to banking services, type and purpose of accounts before the adoption of mobile money service, former methods used for funds transfer (Remittance). Then more information was elicited on mobile money registration, service provider, frequency of use of mobile money and distance travelled to the nearest mobile money agents. Questionnaire measures that measure the impact of mobile money service were adopted and modified from empirical studies such as Ismail & Masinge (2011), Sife *et al.* (2010) and Gross, Hogarth & Schmeiser (2012). The questionnaire measures were presented in Likert type scales to measure the

<sup>&</sup>lt;sup>2</sup> A sample size of 367 was calculated as follows:  $S = X^2NP(1-P) / [d^2(N-1) + P(1-P)]$ . Where S= Sample size, N = Population size, X<sup>2</sup> = Value of Chi-Square @ d. f. = 1at the desired confidence interval from the tables, P = Population proportion (assumed to be 0.5), d = degree of accuracy. Given that N =627171, X2=2.71@ 10% confidence interval, P=0.5 and d=0.1, then the sample size is S = X<sup>2</sup>NP (1-P) / [d<sup>2</sup>(N-1) + P (1-P)] = 2303003.15/6272.3775= 367.

effects of mobile money usage on rural livelihoods. The main variables under investigation were mobile money usage and frequency, savings, productivity, remittances, consumption, communication and wellbeing (wealth). The items sought to indicate how mobile money usage influenced these variables and the consequent effect on rural consumers.

## 3.3. Research ethics

In order to meet the ethical requirements of academic research, the research instrument was reviewed and approved by the ethics committee of the university's research office. Research respondents were assured of confidentiality and their anonymity in the research findings.

## 3.4. Data analysis procedure

Structural equation modelling (SEM) was preferred over other multivariate techniques due to a variety of reasons. In this study, SEM was chosen for its ability to provide information on how well the model fits data. Moreover, the technique was preferred for its ability to be used on data that violate normality assumptions (Byrne, 2010). A two-stage SEM approach was conducted, the first stage performed the following activities; confirmatory factor analysis, average variance extracted and reliability tests. Composite reliability and Cronbach's alpha assessed the extent to which the measurement items were reliably measuring their respective constructs. Construct validity was measured by convergent validity and Discriminant validity. Convergent validity was measured through t-values for item loadings and Discriminant validity requires that average variance extracted for the two constructs exceed the squared correlation between them (Fornell and Larcker, 1981). The results of the study were analysed through SPSS 20.0 to compile the demographic profile of the respondents. The Analysis of Moment Structures (AMOS 24) software was used to assess the measurement model for fitness and subsequently the structural model was tested to investigate the hypothesised structural relationships.

## 4. Results

## 4.1. Mobile money access and use

Table 1 presents data related to previous methods of funds transfer used before the advent of mobile money service together with current mobile money access and usage patterns. The major highlights of the findings were that a very large rural population was financial as excluded prior to the development of mobile money service. As expected the results pointed to a high adoption rate of the service although a significant number of the mobile money service still travelled long-distance (>10km) to access mobile financial services in rural communities. Previous research had pointed outdistance as the major barrier to access to financial services by rural people (Alexandre *et al.*, 2011, Mas, 2010a).

	Frequency	Percent	Valid percent	Cumulative Percent
Bus Driver	206	58.7	58.7	58.7
Post	24	6.8	6.8	65.5
Bank	109	31.1	31.1	96.6
Western Union	12	3.4	3.4	100.0
Total	351	100.0	100.0	
Distance from the nearest Agent				
<1km	45	12.8	12.8	12.8
1km-2km	53	15.1	15.1	27.9
2km-5km	107	30.5	30.5	58.4
5km-10km	28	8.0	8.0	66.4
>10km	118	33.6	33.6	100.0
Total	351	100.0	100.0	
Link ISAL/ SACCOS with Mobile Money				
Yes	34	9.7	9.7	9.7
No	11	3.1	3.1	12.8
Do not know	2	.6	.6	13.4
Not applicable	304	86.6	86.6	100.0
Total	351	100.0	100.0	

TABLE 1: FORMER METHODS OF SENDING (REMITTING) MONEY

Source: Primary data.

## 4.2. Reliability, convergent and discriminant validity assessment

The reliability of the scales was assessed through a series of reliability tests through the Cronbach Alpha coefficient and composite reliability, while validity was assessed through convergent validity and discriminant validity tests. The results are presented in Table 2.

	<b>Cronbach Alpha</b>	CR	AVE	MSV
CON	.864	0.871	0.771	0.115
REM	.957	0.956	0.765	0.333
COM	.777	0.818	0.501	0.333
SAV	.983	0.983	0.905	0.138
PRO	.958	0.955	0.782	0.179
Wealth	.720	0.890	0.802	0.179

Dube and Chummun: Effects of mobile money usage on rural customers' livelihoods in Zimbabwe TABLE 2: RELIABILITY AND VALIDITY ASSESSMENT

Source: Primary data.

Cronbach alpha was used to assess the reliability of the constructs. The six constructs' alpha coefficient ranged between 0.72 and 0.983 while composite reliability ranged 0.871 and 0.0983. Reliability is considered good if the value of the alpha coefficient is above 0.7, however, 0.6 is acceptable (Anderson and Gerbing, 1988, Bagozzi and Yi, 2012). Therefore, the Cronbach alpha coefficient presented in Table 1 indicates good reliability of the scales as they are all above the recommended threshold. In measuring the validity of the instrument two types of validity were assessed, namely discriminant validity and convergent validity. Discriminant validity was established through the average variance extracted (AVE) where a comparison of AVE with the squared correlation of each of the constructs was done as shown in Table 3 below.

	CON	REM	СОМ	SAV	PRO	Wealth
CON	0.878					
REM	0.261	0.870				
COM	0.201	0.577	0.708			
SAV	0.213	0.176	0.261	0.951		
PRO	0.166	0.247	0.244	0.218	0.885	
Wealth	0.339	0.228	0.184	0.372	0.423	0.895

TABLE 3: CORRELATION AND SQUARE ROOT OF AVES MATRIX

Source: Primary data.

Hair Jr, Black, Babin and Anderson (2014) and Fornell and Larcker (1981) maintain that discriminant validity is achieved when the following conditions are satisfied, that is, firstly if the correlation of latent variable score with measurement item reflecting a pattern of loading where the measurement items load highly on their theoretically assigned factor and lowly on other factors. Secondly, the square root of each construct must be greater (larger) than the correlation of the

specific construct with other constructs in the model and its square root must be at least 0.5. Moreover, the discriminant validity of a scale is good when the Maximum Shared Variance (MSV) coefficient is lower than the AVE coefficient.

Convergent validity is achieved when each measurement item correlates strongly with its assumed theoretical construct maintains Fornell and Larcker (1981). Moreover, the items that measure a construct must converge or reflect a high proportion of variance in common. The benchmark for the standardised factor loading is 0.7. In this study all the factor loadings were greater 0.7, the factor loadings ranged between 0.7 and 0.99. Therefore convergent validity of all constructs is good because their AVE ranges between 0.501 and 0.905 which is above 0.5 the recommended threshold (Fornell and Larcker, 1981)." The goodness of fit indices of the measurement model also verified the validity of the constructs (CMIN=2.798, GFI=0.842, CFI=0.954, TLI=0.947 and RAMSEA=0.072) (Van Tonder & De Beer, 2017).

#### 4.3. Structural model

The structural model was tested using the maximum likelihood performed with AMOS 24 and the final hypothesised model is presented in Figure 3. The figure below shows the paths and their standardised regression coefficients.

The fit indices for the structural model (CMIN/df= 2.631, GFI=0.846, CFI=0.956, TLI=0.951, and RMSEA=0.068) indicated that there is a satisfactory model fit based on the comparison of these fit indices with the recommended thresholds (Hair Jr *et al.*, 2014). Therefore, we can conclude that the structural model fits the data satisfactorily and that the structural model (Figure 2) can be used with confidence to conclude on the research hypotheses.

Furthermore, the SEM results presented in Table 4 indicate the "regression (or estimate) coefficients of the various relationships in the structural model (Figure 2) as well as their p values. The SEM findings were assessed using the estimated path coefficient (beta) with critical ratio (C.R. equivalent to the t-values) and p-value. Therefore, to decide whether to reject/accept a hypothesised relationship, the significance testing decision rule was applied. Where t-values greater or equal to 1.96 and p-values less or equal to 0.05 the relationship is considered not significant (Byrne, 2010).



Dube and Chummun: Effects of mobile money usage on rural customers' livelihoods in Zimbabwe FIGURE 3: STRUCTURAL MODEL

Source: Primary data.

Hypothesis	Dependent Variables (DV)		Independent Variables (IV)	Estimate	Critical Ratio (C.R.)	P value	Hypothesis Conclusion
H <sub>1</sub>	Remittances	<	Mobile money usage	254		***	Supported
$H_2$	Productivity	<	Remittances	.163		.011	Supported
H <sub>3</sub>	Consumption	<	Remittances	.248		***	Supported
$H_4$	Savings	<	Communication	.230		***	Supported
H <sub>5</sub>	Productivity	<	Communication	.141		.031	Supported
$H_6$	Wealth	<	Productivity	.346		***	Supported
H <sub>7</sub>	Wealth	<	Savings	.261		***	Supported

Source: Primary data. \*\*\* Indicates significant relationship at the level 0.0001

Table 4 summarises the hypothesised relationships and their conclusions. All the hypothesised relationships were supported.

## 4.4. Discussion of results

The conceptual model above has shown the potential pathways through which mobile money impacts on the welfare of rural consumers. Based on SEM findings, there is a direct impact of mobile money usage on remittances, communication while indirectly impacting on consumption, productivity and savings and household welfare as theorised in literature, (Kasseeah & Tandrayen-Ragoobur, 2012, Donner & Tellez, 2008, Jenkins, 2008). The impact of mobile money on household welfare is presumed on remittance flows from household members working outside the village. The adoption and usage of cost-effective mobile financial service has greatly improved the way the family members can support their family members back in the village. Similar observations were made by Andrianaivo and Kpodar (2012) on how mobile financial services boost financial inclusion to the rural poor. With an increased income from relatives and friends, mobile money users are able to meet their monthly financial needs and the excess can, therefore, be appropriated for other competing needs like consumption, savings and productivity areas. The SEM findings confirm untested theorised assertions by Alampay et al. (2017) and Hinson (2011) that mobile financial services has developmental impact on remittances, financial inclusion and livelihood efficiencies.

Mobile money-based remittances increase productivity of rural people as the remitted funds were allocated to promote rural livelihood in the agricultural sector which formed the main livelihood activity of the rural people. The funds were used to purchase implements and inputs. The results seem to imply that remittances improve the income levels of the rural people and have an impact on the expenditure patterns consequently pointing to an increase in consumption. These results are analogous to Tenaw and Islam (2009) findings where remittances were seen as a source of income with a poverty reduction effect to the rural poor. Similarly, Zarate-Hoyos (2004) reached the same conclusion on the effect of remittances on consumption showing a high tendency to allocate remittances to consumption. Remittances increase consumption in the category of food items, as they are partly sent to supplement the incomes of the rural household (Munyegera and Matsumoto, 2016).

Positive and significant effects of communication on rural household saving patterns were noted. The communication function of the mobile phone is very

important especially when savings are incorporated in the informal group savings schemes such as the internal saving and lending <sup>3</sup> (ISAL) and the savings and credit cooperatives (SACCOs). It allows the group members to maintain a permanent record on the transactions carried out through the mobile money facility as it provides detailed transaction record. Mobile money, therefore, fulfils one of the major security requirements of an online transaction, which is non-repudiation by a third party after a transaction has taken place. Therefore, in the context of group saving schemes, any improvement in communication in relation to mobile money has positive effect on the group's savings (Kumar and Gupta, 2009). It has helped the rural households to migrate from the traditional saving methods to more secure formal method of saving. This is one way of formalising rural financial services. The more important implication of this result is on financial inclusion, once the members are able to save their funds using the mobile money facility it means they become financially included. Previous studies have pointed out that access to savings is one of the features of a financially inclusive system (Sangare, 2018, Alexandre and Eisenhart, 2013, Must and Ludewig, 2010).

Moreover, mobile phone communication significantly and positively impacted on the productivity of rural communities. The mobile phone technology serves a dual purpose, on one hand it's a communication tool for mobilising and coordinating production resources, on the other hand, it provides mobile money transfer and payment services for materials, equipment and other productionrelated services. It was emphasised earlier that rural livelihood is much depended on agricultural activity; hence the mobile phone can be used in sourcing out inputs and also share market information. It is also used to receive payment for the products and to make payments for services rendered to the producer.

## 5. Conclusion and recommendations

The results have shown that rural productivity is positively influenced by the use of mobile money remittances. There are productivity gains arising from the use of mobile money as it allows rural households to access market information, inputs and increased income from higher agricultural yields. The use of remittances for healthcare and other services would benefit directly from such a policy. Household consumption improved in food and clothing items, while expenditure on infrastructure like housing remained low. Mobile money

<sup>&</sup>lt;sup>3</sup> These are informal community based schemes where group members pool funds together over a given period of time. Maround or Mukando are the good examples of such schemes.

users also invested in livestock (cattle, goats), especially those who received higher remittances. Savings were also measured as one of the study variables that was impacted by the use of mobile money, as household were able to store their money safely in their wallet. While saving has been partially adopted by rural households, microcredit facility has not been adopted.

Therefore, the study recommends that service providers develop a way of extending credit facility to rural household ensuring minimum risk to a credit provider. The starting point could be credit facilities for agricultural activities or promotion of the already existing schemes like SACCOS and ISALs. These are the lending schemes which rural people are already familiar with. Promotion of mobile money SACCOs or ISALs will formalise the services as indicated in Table 1. These schemes if properly marketed will attract many rural mobile money users to borrow to finance small agricultural projects. Besides, credit application must be made much simpler or instant such that with a few screen forms it can be possible for the individual to apply for a loan. This will have a positive effect of encouraging rural mobile money users to to the member's group thereby creating a joint responsibility of repayment in the event the member defaults in their repayment obligation."

In future, research efforts must be directed in the investigation of mobile money credit facilities and how they influence the welfare of rural communities, especially the mobile-based community schemes SACCOs and ISALs. This is because most mobile money users indicated that they did not use this facility although mobile financial services providers are offering it. Future research must be directed to use of mobile money services that have adopted SACCOs and ISALs for accessing credit using rural-based forms of collateral.

#### **Biographical Notes**

**Thulani Dube** is a lecturer at the Bindura University in Zimbabwe. Dr Dube received his PhD in 2018 under the supervision of DR. BZ Chummun at the University of UKZN. Dr Dube research interests are mainly mobile money, financial inclusion and electronic commerce.

**Bibi Zaheenah Chummun** is a Senior Lecturer at the University of KwaZulu-Natal (UKZN) Graduate School of Business and Leadership (GSB&L) based on Westville Campus in Durban - South Africa. Dr Chummun has published several papers in the field of problem analysis and solving, people empowerment, microinsurance, business management and financial inclusion. She currently lectures at UKZN on Local Economic Development programmes and Masters Programmes. She is supervising Masters and PhD students in those fields of management and research interest. Her undergraduate degree is from Glasgow Caledonian University, UK. She is a Chartered Insurer from the Chartered Insurance Institute in the UK. She obtained her MBA from Nelson Mandela Metropolitan University (NMMU - South Africa) in 2010 and her PhD in 2012 from North West University (NWU-South Africa). Dr BZ Chummun is originally from the island of Mauritius.

#### References

- Aker, J. 2010. Dial "A" for agriculture: using information and communication technologies for agricultural extension in developing countries. Conference Agriculture for Development-Revisited. University of California at Berkeley, October, 1-2.
- Aker, J. & Mbiti, I. 2010. Mobile phones and economic development in Africa. Center for Global Development Working Paper.
- Alampay, E.A., Moshi, G.C., Ghosh, I., Peralta, M.L.C. & Harshanti, J. 2017. The impact of mobile financial services in low-and lower-middle-income countries. International Development Research Centre, Ottawa, Canada, and the Department for International Development, UK.
- Alexandre, C. & Eisenhart, L.C. 2013. [8WashJLTech&Arts0285] Mobile Money as an Engine of Financial Inclusion and Lynchpin of Financial Integrity.
- Alexandre, C., Mas, I. & Radcliffe, D. 2011. Regulating new banking models to bring financial services to all. *Challenge*, 54, 116-134.
- Alleman, J. and Rappoport, P., 2010. Mobile money: Implications for emerging markets. *Communications and strategies*, 79, 15-28.
- Anderson, J.C. & Gerbing, D.W. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411.
- Andrianaivo, M. & Kpodar, K. 2012. Mobile phones, financial inclusion, and growth. *Review of Economics and Institutions*, 3, 30.
- Anyasi, F. & Otubu, P. 2009. Mobile phone technology in banking system: Its economic effect. *Research Journal of Information Technology*, 1, 1-5.

- Ashraf, N., Giné, X. & Karlan, D. 2006. Growing export-oriented crops in kenya: An evaluation of drumnet services, World Bank.
- Bagozzi, R.P. & Yi, Y. 2012. Specification, evaluation, and interpretation of structural equation models. *Journal of the academy of marketing science*, 40, 8-34.
- Banerjee, A.V. & Duflo, E. 2007. The economic lives of the poor. *The Journal* of *Economic Perspectives*, 21, 141-167.
- Barnett, W.I. & Block, W. 2007. Saving and investment: A praxeological approach. *New Perspectives on Political Economy*, 3, 129-38.
- Baumüller, H. 2012. Facilitating agricultural technology adoption among the poor: The role of service delivery through mobile phones. ZEF Working paper series 93, ISSN 1864-6638, Center for Development Research (ZEF), University of Bonn.
- Beck, T., Demirgüç-Kunt, A. & Honohan, P. 2009. Access to financial services: Measurement, impact, and policies. *The World Bank Research Observer*, 24, 119-145.
- Bhavnani, A., Chiu, R.W.-W., Janakiram, S., Silarszky, P. & Bhatia, D. 2008. The role of mobile phones in sustainable rural poverty reduction. Available at: http://siteresources.worldbank.org/ EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/ Resources/The\_Role\_of\_Mobile\_Phones\_in\_Sustainable\_Rural\_Poverty\_ Reduction\_June\_2008.pdf.Retrieved November, 02, 2018.
- Byrne, B. 2010. Structural Equation Modelling, Routledge.
- Chummun, B.Z., 2019. Mobile Security in Low-Income Households' Businesses: A Measure of Financial Inclusion. In Cyber Law, Privacy, and Security: Concepts, Methodologies, Tools, and Applications; 576-595. IGI Global.
- Chummun, BZ. and Ojah, K.(2016). Aggregate Savings and Financial inclusion: Lessons for Developing African Economies. *African Growth Agenda Journal*; 13(3); 4 - 9.
- De Silva, H. & Ratnadiwakara, D. 2008. Using ICT to reduce transaction costs in agriculture through better communication: A case-study from Sri Lanka. LIRNEasia, Colombo, Sri Lanka, Nov.
- De Sousa, S. 2010. The role of payment systems in reaching the unbanked. *Journal of Payments Strategy & Systems*, 4, 145-155.

#### Dube and Chummun: Effects of mobile money usage on rural customers' livelihoods in Zimbabwe

- Demombynes, G. & Thegeya, A. 2012. Kenya's mobile revolution and the promise of mobile savings. World Bank Policy Research Working Paper.
- Dermish, A., Kneiding, C., Leishman, P. & Mas, I. 2012. Branchless and mobile banking solutions for the poor: a survey of the literature. *Journal of Innovations Technology Governance Globalization*, 6(4), DOI: 10.2139/ssrn.1745967
- Diga, K. 2008. Mobile cell phones and poverty reduction: Technology spending patterns and poverty level change among households in Uganda. Workshop on the Role of Mobile Technologies in Fostering Social Development, International Development Research Centre.
- Dolan, J. 2009. Accelerating the development of mobile money ecosystems. Proceeding of Mobile Money Summit.
- Donner, J. & Tellez, C.A. 2008. Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, 18, 318-332.
- Donovan, K. 2012. Mobile money for financial inclusion. *Information and Communications for Development*, 61, 61-73.
- Duncombe, R. & Boateng, R. 2009. Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence and future research directions. *Third World Quarterly*, 30, 1237-1258.
- Durand, J., Kandel, W., Parrado, E.A. & Massey, D.S. 1996. International migration and development in Mexican communities. *Demography*, 33, 249-264.
- Durand, M. & Smith, C. 2013. The OECD approach to measuring subjective well-being. World happiness report, 2013, 112-137.
- Flores-Roux, E. & Mariscal, J. The development of mobile money systems. Proceedings of the 4th ACORN-REDECOM Conference Brasilia, Brazil, May 14-15, 2010.
- Fornell, C. & Larcker, D.F. 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 39-50.
- Garip, F. 2011. Network effects and social inequality. *Annual Review of Sociology*, 38, 93-118.
- Gencer, M. 2011. The mobile money movement: Catalyst to jump-start emerging markets. *Innovations*, 6, 101-117.

- Ghosh, M. 2006. Economic growth and human development in Indian states. *Economic and Political Weekly*, 3321-3329.
- Goodman, D. 2005. Linking mobile phone ownership and use to social capital in rural South Africa and Tanzania. INTERMEDIA-LONDON-, 33, 26.
- Gordon, J., Zhao, S. & Gretton, P. 2015. On productivity: concepts and measurement. In: AUSTRALIAN-GOVERNMENT (ed.) Productivity Commission Staff Research Note. Australia: Canberra: Productivity Commission.
- Goss, S., Mas, I., Radcliffe, D. & Stark, E. The next challenge: Challenging savings through mobile money schemes. World Economic Forum Report, 2011.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. & Tatham, R.L. 1998. Multivariate data analysis, Prentice hall Upper Saddle River, NJ.
- Hair Jr, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. 2014. Mutlivariate Analysis, Pearson.
- Hinson, R.E. 2011. Banking the poor: The role of mobiles. *Journal of Financial Services Marketing*, 15, 320-333.
- Hudson, H.E. 2013. From rural village to global village: Telecommunications for development in the information age, Routledge.
- Iacobucci, D. 2010. Structural equations modeling: Fit indices, sample size, and advanced topics. Sample Size, and Advanced Topics.
- Ivankova, N.V., Creswell, J.W. & Stick, S.L. 2006. Using mixed-methods sequential explanatory design: From theory to practice. *Field methods*, 18, 3-20.
- Jack, W. & Suri, T. 2011. Mobile money: the economics of M-PESA. National Bureau of Economic Research.
- Jacob, N.M. 2014. Mobile Money Transaction As A Drive Towards Improvement Of Farm Produce Sales To Small Scale Farmers In Trans Nzoia County A Study Of Women In Kitale Town. *International Journal of Technology Enhancements and Emerging Engineering Research*, 9(2), 76-81
- Jain, A., Hong, L. & Pankanti, S. 2008. Economic impact of mobile communications in Serbia, Ukraine, Malaysia, Thailand, Bangladesh, and Pakistan, A report prepared for Telenor ASA. Tech. Rep., Jan.
- Jenkins, B. 2008. Developing mobile money ecosystems. Washington, DC: International Finance Corporation and Harvard Kennedy School.

- Karlan, D., Ratan, A.L. & Zinman, J. 2014. Savings by and for the Poor: A Research Review and Agenda. *Review of Income and Wealth*, 60, 36-78.
- Kasseeah, H. & Tandrayen-Ragoobur, V. 2012. Mobile Money in an Emerging Small Island Economy. *ARPN Journal of Science and Technology*, 2, 454-458.
- Kaul, V. 2011. Development communication in India: Prospect, issues and trends. *Global Media Journal*, 2, 1-31.
- Kirui, O.K., Okello, J.J., Nyikal, R.A. & Njiraini, G.W. 2013. Impact of mobile phone-based money transfer services in agriculture: evidence from Kenya. *Quarterly Journal of International Agriculture*, 52, 141-162.
- Kline, R.B. 2012. Assumptions in structural equation modeling. In R. H. Hoyle (Ed.), Handbook of structural equation modeling, 111-125. New York, NY, US: The Guilford Press.
- Krejcie, R.V. & Morgan, D.W. 1970. Determining sample size for research activities. *Educational and psychological measurement*, 30, 607-610.
- Kumar, A. & Gupta, H. 2009. Branchless banking and financial inclusion. Siliconindia, 12, 40-42.
- Kumbhar, M. V.(2011). A Multinational Concept Instrument (eFI-Test) for Assessment of E-Financial Inclusion. National Conference on Accounting of Social Sector Development, Dpt of Economics, Shivaji University, Kolhapur, India, 2011.
- Ky, S., Rugemintwari, C. & Sauviat, A. 2016. Does mobile money affect saving behavior? Evidence from a developing country. Available at: https://hal-unilim.archives-ouvertes.fr/hal-01360028v2/document, Retrieved on October 31 2019.
- Lei, P.W. & Wu, Q. 2007. Introduction to structural equation modeling: Issues and practical considerations. *Educational Measurement: issues and practice*, 26, 33-43.
- López, F., Escala-Rabadan, L. & Hinojosa-Ojeda, R. 2001. Migrant associations, remittances, and regional development between Los Angeles and Oaxaca, Mexico. University of California, Los Ángeles, North American Integration and Development Center.
- Maphosa, F. 2007. Remittances and development: the impact of migration to South Africa on rural livelihoods in southern Zimbabwe. *Development Southern Africa*, 24, 123-136.

- Martin, B.L. 2010. Mobile phones and rural livelihoods: An exploration of mobile phone diffusion, uses, and perceived impacts of uses among small-to medium-size farm holders in Kamuli District, Uganda, Iowa State University.
- Martin, D.F. 2005. Plagiarism and technology: A tool for coping with plagiarism. *Journal of Education for Business*, 80, 149-152.
- Mas, I. 2010a. Banking for the Poor: State-of-the-Art Financial Offerings for the Developing World. The International Economy, Fall 2010. Available at SSRN: https://ssrn.com/abstract=1709164, Retrieved October 30, 2019.
- Mas, I. 2010b. Savings for the Poor: Banking on Mobile Phones. World Economics, 11(4), Oct - Dec. 2010
- Mas, I. & Mayer, C. 2011. Savings as forward payments: Innovations on mobile money platforms. Available at https://www.findevgateway.org/library/ savings-forward-payments-innovations-mobile-money-platforms. DOI: 10.2139/ssrn.1825122.
- Masuki, K., Kamugisha, R., Mowo, J., Tanui, J., Tukahirwa, J., Mogoi, J. & Adera, E. Role of mobile phones in improving communication and information delivery for agricultural development: Lessons from South Western Uganda. Workshop at Makerere University, Uganda, 2010. 22-23.
- Mbiti, I. & Weil, D.N. 2016. Mobile banking: The impact of M-Pesa in Kenya. Chapter in NBER book African Successes, Volume III: Modernization and Development. National Bureau of Economic Research.
- Mittal, S. & Mehar, M. 2012. How mobile phones contribute to growth of small farmers? Evidence from India. *Quarterly Journal of International Agriculture*, 51, 227.
- 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, 509-525.
- Morawczynski, O. & Pickens, M. 2009. Poor People Using Mobile Financial Services : Observations on Customer Usage and Impact from M-PESA, World Bank Other Operational Studies 9492, The World Bank.
- Munyegera, G.K. & Matsumoto, T. 2016. Mobile money, remittances, and household welfare: panel evidence from rural Uganda. *World Development*, 79, 127-137.
- Must, B. & Ludewig, K. 2010. Mobile money: cell phone banking in developing countries. *Policy Matters Journal*, 7, 27-33.

- Nagarajan, G. & Haas, S. 2011. Measuring the Impact of Financial Services on the Developing World. IRIS Report.
- Ncube, G. & Gómez, G.M. 2011. Local economic development and migrant remittances: in rural Zimbabwe: building on sand or solid ground?
- Oluwatayo, I. 2013. Banking the unbanked in rural southwest Nigeria: Showcasing mobile phones as mobile banks among farming households. *Journal of Financial Services Marketing*, 18, 65-73.
- Orozco, M. & Lindley, A. 2007. Country Profile: Zimbabwe. Migrant Remittances Newsletter, 4, 6.
- Pender, J., Marré, A. & Reeder, R. 2011. Rural wealth creation: concepts, measures, and strategies. *American Journal of Agricultural Economics*, 94, 535-541.
- Piana, V. 2003. Product differentiation. Economics Web Institute.
- Radner, D.B. & Vaughan, D.R. 1987. Wealth, income, and the economic status of aged households. International Comparisons of the Distribution of Household Wealth, 93-120.
- Ryder, A. 2014. Window to The Unbanked: The Potential of Mobile Money as a Means of Saving in Uganda.
- Samuelson, P. & Nordhaus, W. 1985. Principles of economics. McCraw-Hill, New York, any edition.
- Sangare, M. and Fofana, K., 2018. Towards a Smart Metropolitan Regional Development - Spatial and Economic. Smart Metropolitan Regional Development: Economic and Spatial Design Strategies, p.239.
- Sarma, M. 2008. Index of financial inclusion. Indian Council for Research on International Economics Relations New Delhi.
- Sarma, M. & Pais, J. 2011. Financial inclusion and development. *Journal of International Development*, 23, 613-628.
- Short, K. 2014. The supplemental poverty measure: 2013. Current Population Reports.
- Sife, A.S., Kiondo, E. & Lyimo-Macha, J.G. 2010. Contribution of mobile phones to rural livelihoods and poverty reduction in Morogoro region, Tanzania.
- Stiglitz, J., Sen, A. & Fitoussi, J.-P. 2009. The measurement of economic performance and social progress revisited. Reflections and overview. Commission on the Measurement of Economic Performance and Social Progress, Paris.

- Suri, T., Jack, W. & Stoker, T.M. 2012. Documenting the birth of a financial economy. Proceedings of the National Academy of Sciences, 109, 10257-10262.
- Taplin, D.H., Clark, H., Collins, E. & Colby, D.C. 2013. Theory of change. New York: Actknowledge and the Rockefeller Foundation.
- Tenaw, S. & Islam, K.Z. 2009. Rural financial services and effects of microfinance on agricultural productivity and on poverty. University of Helsinki Department of Economics and Management (Discussion Papers series), 1, 28.
- Valters, C. 2015. Theories of change. Time for a radical approach to learning in development. Available at: https://www.odi.org/sites/odi.org.uk/files/ odi-assets/publications-opinion-files/9835.pdf. ISSN: 2052-7209. Overseas Development Institute.
- Vogel, I. 2012. Review of the use of 'Theory of Change'in international development. UK: Department for International Development (DFID).
- Williams, C. 2007. Research Methods. Journal of Business and Economic Research, 5, 65-72.
- Wolff, E.N. & Zacharias, A. 2009. Household wealth and the measurement of economic well-being in the United States. *The Journal of Economic Inequality*, 7, 83-115.
- Wolff, E.N., Zacharias, A. & Caner, A. 2004. Levy Institute measure of economic well-being: concept, measurement, and findings: United States, 1989 and 2000, Levy Economics Institute of Bard College.
- Zarate-Hoyos, G.A. 2004. Consumption and remittances in migrant households: toward a productive use of remittances. *Contemporary Economic Policy*, 22, 555-565.
- Zhou, H., Pindiriri, C. & Tambama, J. 2013. Consumption Response to Diaspora Remittances in Zimbabwe. *Botswana Journal of Economics*, 11.
- Zimstat 2013. Population Census National Report 2012. Zimbabwe National Statistics Agency (Zimstat) Office, Harare. Available at: http://www.zimstat. co.zw/sites/default/files/img/publications/Population/National\_Report.pdf, Retrieved 23 Febrauary 2019.