

**Rwanda
Mobile
Money
Report**

Exploring the Use of Mobile Money Services among Tea SACCOs in Rwanda

Challenges and Opportunities

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Executive Summary

This project explored the social impact of mobile money services among tea Savings and Credit Co-operatives (SACCOs) members in Rwanda, following the implementation of a payment automation project funded by Access to Finance Rwanda (AFR). In this project, banking operations of two SACCOs were automated and integrated with a mobile money platform, Tigo-Cash. This integration aimed to help the SACCO members to access their money through the mobile money platform and reduce the time farmers and pickers spent visiting their SACCOs to receive their wages and salaries in cash. It was envisaged that both farmers and pickers would spend more time working on the tea farms and this would improve their productivity in terms of the amount of tea delivered to the factory, as well as the quality of tea delivered.

Research Methodology

This research looked at the experiences of members of the targeted SACCOs in order to understand the opportunities and challenges that emerged from this automation. Further, the study sought to assess any potential spillovers of transitioning agricultural cooperatives to a mobile money payment system. The research approach was qualitative in nature and used a combination of diary studies, focus group discussions, individual in-depth interviews, observations and key informant interviews. However, in order to explore the demographic characteristics of the respondents, the research team also collected limited quantitative data on research participants.

Various data analysis methods were employed including quantitative analysis, content analysis and discourse analysis. Qualitative data analysis was done under six themes which included:

1. Uptake and farmers experiences with mobile money
2. Benefits and opportunities of mobile money for farmers
3. Challenges and limitations to mobile money access
4. Value propositions for various stakeholders
5. Regulatory aspects for growth and sustainability of mobile money in Rwanda
6. Effects of COVID-19 on mobile money experiences

Findings

The research findings indicate that although mobile phone ownership and registration for mobile money network is high, usage of mobile money services among research participants is still quite low. The results further show that respondents in *ubudehe*¹ 3 had a better access and uptake to mobile money services while compared to *ubudehe* 2. Male respondents also had a better access to mobile money services. Given that ownership of phones and mobile money services are both high among *ubudehe* 3, access and uptake may be associated with ownership. The same observation is made for male respondents who reported a high level of phone ownership as well as access to mobile money services. The most prevalent use of mobile money prior to COVID-19 lockdown was the purchasing of airtime with very few respondents using mobile money to send and receive money. Very few respondents used the mobile money services for pull² services between the SACCO accounts to the mobile money wallet prior to COVID-19 lockdown. However, during the COVID-19 lockdown and after, there was a surge in the usage of mobile money services with sending of money being the most prevalent. Some respondents also started using mobile money services to pay for goods and services as well as paying bills, which was not observed prior to COVID-19. There was also a significant increase of the pull services between the SACCO accounts and mobile money wallets with no indication that respondents pushed money from their mobile money wallets to the accounts.

Although transaction costs were frequently cited as a hindrance to mobile money usage, particularly among poorer respondents, the changes to Digital Financial Services (DFS) as a result of COVID-19 highlights an interesting dynamic. The complete removal of fees during the COVID-19 lockdown period caused a surge in mobile money transactions, and the later reintroduction of the fees did not negate these gains. Further investigation is required to understand this dynamic. The results also reveal that respondents are not fully aware of the cost structure of mobile money services, leading them to use inaccurate information when making decisions regarding mobile money.

The main obstacle to using the mobile money services is lack of enough float³ for mobile money agents with a number of respondents indicating that agents frequently lack enough cash to serve them. The agents interviewed also concurred with this perspective noting that they often ran out

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1. In Rwanda, the word *Ubudehe* has two meanings. The first one defines the traditional Rwandan practice and cultural value of working together to solve problems. In this context it is a method of addressing rural poverty through community collective action creating empowerment while helping local people to create social capital, nurture citizenship and build a strong civil society (Mupenzi, 2010). The other context is where households are classified into socio-economic classes known as '*Ubudehe* categories' with *ubudehe* 1 being the extremely poor and often supported under government different social protection while *Ubudehe* 4 are the well to do in the society (Nizeyimana et. al, 2018). The second context of *ubudehe* is the one referred to in this study..

2. According to GSMA (<https://www.gsma.com/mobilefordevelopment>) pull services refer to bank-to-mobile transfers while push services refer to mobile-to-bank transfers

3. This refers to the balance of e-money, or physical cash, or money in a bank account that an agent can immediately access to meet customer demands to purchase (cash in) or sell (cash out) electronic money (GSMA, 2020)

of cash especially where the number of withdrawals are higher than the deposits. In a few cases and especially in Rusizi, geographical distance between respondents and agents was also indicated as a hindrance. More research is required to understand how different business models handle the challenge of cash limitations for mobile money agents.

This study revealed that mobile payment systems are relatively easy to use, although those who have not used the services have a perception that it is hard to use the service. After the COVID-19 lockdown, this perception changed substantially as evidenced by increased usage. However, negative perception towards mobile money services have persisted due to challenges such as poor network. Study results signaled that for mobile money disbursement systems to be successfully adopted among rural communities, comprehensive training is required for both mobile money adopters within the SACCO and as well as members who have not adopted the mobile money services. These trainings should take the form of collaboration between mobile network operators (MNOs), regulators and other players in the financial sector.

Suggestions for Success

The main recommendations of this study include the following:

Both MNOs and SACCOs should consider providing digital financial training as well as literacy training in order to increase the knowledge and confidence of using mobile money services. This will also eliminate the security concerns that are a major hindrance to usage of mobile money services. Further, SACCO management should survey members who are not involved in the mobile money disbursement scheme and identify hindrances to uptake so that these challenges can be addressed in the training plan. USAID, AFR, and other actors in this space could consider supporting a comprehensive training program on mobile money services so as to address the digital literacy problems.

- Regulators such as the Rwanda Cooperative Agency (RCA) should better understand the unintended consequences of some policies including the requirement that all training for members should be sanctioned and validated. This rule denies the SACCOs the opportunity to identify and address challenges through peer-to-peer training. Removing such obstacles should be considered.
- To inform further intervention in this sector, there is a need for RCA, in collaboration with USAID, AFR and other potential actors to visit other non-tea SACCOs to see what systems they are using. This should include SACCOs in both urban and rural areas to explore effective money transfer systems in different geographic contexts.
- USAID, AFR and other actors could consider providing automation services to more SACCOs in diverse sectors and locations. This will illuminate a broader array of experiences with mobile money use and uptake.
- MNOs should work to improve connectivity (which is currently poor) and reduce inconsistencies in network coverage. It is also important for the MNOs and other stakeholders to consider

investments in network infrastructure improvements in remote districts. They should also work with SACCO management to address issues with the platform which connects SACCO accounts to mobile money wallets.

- MNOs and other stakeholders should explore strategies of increasing the number of merchants who are able to provide the mobile payment service in the rural areas to encourage the use of the service among rural communities.
- Given that there is a reasonable penetration of both mobile phones and mobile money, another useful consideration for USAID, AFR and other actors could be to pilot several targeted functionalities aimed at increasing the benefits of mobile money users beyond the traditional mobile money functions. A starting point would be piloting mobile payment functions, and piloting functionalities that could increase the movement of money from mobile money wallets to bank accounts (to encourage savings).
- Our findings suggest that SACCO-owned kiosks are an attractive alternative to the independent MNO agents, providing improved security and generally boosting confidence in mobile money. These kiosks should be placed in rural neighborhoods to reduce travel time to agents. The use of multiple MNOs in providing the mobile payment scheme for the SACCOs should also be explored.
- MNOs should consider increasing the number of agents at the village level as well as including the use of super-agents as franchises in their business model. This will help to expand mobile money usage among rural communities.



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Acronyms and Abbreviations

AFR	Access to Finance Rwanda
EAC	East African Community
DFID	Department for International Development
DFS	Digital financial services
DIL	Development Impact Lab
BNR	National Bank of Rwanda
MNOs	Mobile Network Operators
RCA	Rwanda Cooperative Agency
RURA	Rwanda Utilities Regulatory Board
SACCO	Savings and Credit Co-operative
USAID	United States Agency for International Development

Table of Contents

Acronyms and Abbreviations	6
1. Introduction	9
1.1 Project Stakeholders/Initiators	9
1.2 Project Background	9
1.3 Context and Background of Financial Inclusion, Digital Financial Services, and Mobile Money in Rwanda	10
1.3.1 Overview of Digital Financial Services	10
1.3.2 Mobile Money in Rwanda	11
1.3.3 Rwanda's Regulatory Environment	11
1.4 Problem Statement and Purpose of Study	12
1.5 Scope of Study	14
1.5.1 Limitations	14
2. Research Methodology	15
2.1 Research Design and Objectives	15
2.1.1 COVID-19 Additions to Research Questions	15
2.2 Data Collection Methods and Sampling techniques	16
2.2.1 Diary Studies	16
2.2.2 Interviews	17
2.2.3 Key Informant Interviews	17
2.2.4 Participant Observation	18
2.2.5: Quantitative Data	18
2.3 Revisions to Data Collection Following COVID-19 Outbreak and Lockdown	18
2.4 Data Analysis	19
3. Key Findings	20
3.1 Research Question 1: How do demographic and socio-economic dynamics affect uptake of mobile money services in Rwanda?	20
3.2 Research Question 2: What are the costs and benefits to farmers receiving funds in their mobile money?	20

3.3 Research Question 3: What factors might limit access to and usage of the service?	21
3.4 Research Question 4: What are the value propositions on how different stakeholders can increase value for mobile services to users in the value chain?	21
3.5 Research Question 5: What are potential ways to increase the value of mobile money payments in the lives of farmers?	23
3.6 Research Question 6: What regulatory aspects need to be addressed to drive the growth and sustainability for mobile money in Rwanda?	23
4. Analysis and Discussion	24
4.1 Respondents' Demographic and Socio-Economic Characteristics	24
4.2 Income, Expenditure, and Household Size of Participants	25
4.3 Socio-Economic Dynamics Influencing Uptake of Mobile Money Services	26
4.4: Benefits and Opportunities of Mobile Money for Farmers	33
4.5: Challenges and Limitations to Mobile Money Access	35
4.6 Value Propositions on how different stakeholders can increase value to farmers	37
4.7 Regulatory Aspects for Growth and Sustainability of Mobile Money in Rwanda	39
4.8: Effects of COVID-19 on Mobile Money Experiences	40
5. Policy Implications and Other Opportunities for Digital Financial Services in Rwanda	40
6. Conclusion	42
6.1 Summary of Findings	42
6.2 Recommendations	43
6.3 Additional Questions Generated	44
Bibliography	45
Appendices	47
Annex 1	47
Annex 2	48
Annex 3	49
Annex 4	50
Annex 5	51

1. Introduction

1.1 Project Stakeholders/Initiators

The United States Agency for International Development (USAID) is a leading international development agency and a catalytic actor driving development results. The Development Impact Lab (DIL) is an international consortium of universities and research institutes working to advance global development through innovations in science and technology. Headquartered at the University of California, Berkeley (UCB), DIL was launched in 2012 with support from the Global Development Lab’s Higher Education Solutions Network within USAID with the explicit goal of better harnessing the ingenuity and expertise in universities to advance international development. Co-managed by the Blum Center for Developing Economies and the Center for Effective Global Action (CEGA), DIL works with USAID to explore research questions around “development solutions” that couple technological advances with novel economic and behavioral interventions. As part of this, DIL focuses not only on basic engineering research and innovation, but also on the real-world evaluation and iterative redesign of their portfolio of development technologies.

Access to Finance Rwanda (AFR) was established in March 2010 by the governments of the United Kingdom (UK) and Rwanda and with support from the UK Department for International Development (DFID) and other development partners. AFR’s strategic focus is stimulating financial sector development by partnering with financial institutions and other stakeholders to increase access to and use of financial services. AFR supports the Government of Rwanda’s development objectives by aligning all of its interventions to the national policy frameworks including the National Transformation Strategy and Financial Inclusion Strategy. In partnership with AFR, DIL, and USAID, researchers from Mount Kenya University Rwanda sought to understand the financial lives of members of two savings and credit cooperatives (SACCOs) in the tea sector in Rwanda.

1.2 Project Background

This project builds on an initiative by AFR that aims to transform tea SACCOs by automating and integrating them with mobile money disbursement systems. The initial automation project targeted three tea SACCOs in Rwanda: MTG SACCO and Ishema Mulindi SACCO in Gicumbi district (which have since merged into one under the name MTG Ishema SACCO), and Shagasha Tea SACCO in Rusizi. The aim of the automation project was to reduce the time farmers and pickers spent visiting their SACCOs to receive cash, which was expected to improve productivity. AFR offered the three SACCOs funding and technical support to automate their banking operations, after which the automated banking platforms were integrated with Tigo’s⁴ mobile money platform. The intention was that members could instantly transfer money from their SACCO accounts into

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4. Rwanda Utilities Regulatory Authority (RURA), sanctioned the merger of Tigo and Airtel on Tuesday January 23,2018 to form what is now known as Airtel-Tigo (New Times, January 25, 2018

their mobile money wallets. Once the money is transferred to the wallet, members can withdraw cash through a mobile money agent or carry out transactions through their mobile phones. To facilitate this, Tigo Rwanda provided 11,000 mobile phones to farmers at a subsidized price. As reported by AFR (Annual Report, 2017), the project led to increased profitability for the SACCOs as well as increased use of mobile money services by over 9,000 members. Following the successful automation of the first three SACCOs, AFR has embarked on a project to scale-up this effort. Currently, AFR is automating five more SACCOs including: AMIZERO SACCO Gisakura which is located in Bushekeri sector and GATARE Tea Farmers SACCO located in Karambi sector both of which are in Nyamasheke district in Western Province; CSTCR and COOPEC TRASO both in Kinyihira, Rulindo district in Northern province; and PFUNDA Tea Farmers and Workers SACCO in Nyundo sector, Rubavu district in Western province.

This research explores the experiences of the members of the beneficiaries of the initial automation project in order to understand the opportunities and challenges that emerged from this automation. Further, the study seeks to assess any potential spillovers of transitioning agricultural cooperatives to a mobile money payment system.

1.3 Context and Background of Financial Inclusion, Digital Financial Services, and Mobile Money in Rwanda

1.3.1 Overview of Digital Financial Services

Mobile money is increasingly used by governments and NGOs to deliver household grants, income support, and other social transfers to beneficiaries (see Kemal, 2019). Mobile money services have increased access to financial services due to the fact that transactions are made via mobile phones, which have become available and affordable to many. Additionally, expansive agent networks available in neighborhoods of rural and urban areas and at most times of day or night act as cash in and cash out points. Digital financial services (DFS) are therefore becoming a welcome alternative to the conventional financial services provided by banks.

The aim of mobile money is to reduce the use of cash while at the same time allowing people to pay for goods and services. On the one hand, a mobile money subscriber uses the mobile money account (where a mobile phone is linked to a cash pool that has been pre-funded) to make payments for goods and services as well as paying bills and transferring money. On the other hand, in what is commonly known as mobile banking, mobile money is linked to a bank account and allows users to operate a bank account using one's mobile phone (Okoli, 2013). The bank customer is able to perform basic operations such as topping up airtime, transferring money, paying bills and checking account balances. Mobile money doesn't earn any interest, and an account can be opened within a few minutes from one's mobile phone without necessarily visiting a bank or paying an initial deposit. Mobile money facilitates the transfer of money almost anywhere and at any time. This increases accessibility, particularly in rural areas, reduces dependence on physical cash, and allows tracking of

transaction records. It also reduces inherent risks of cash handling such as loss, theft or fraud, and has lower transaction costs with improved security compared to credit card methods. Inherent benefits of mobile money can also be gained through interoperability by interconnecting mobile money services with external parties (Mahindra, 2019). In this way, value for both customers and commercial players is created. Interoperability is increasingly cited as a solution to increase transaction volumes and extend the range of financial products offered through the mobile phone.

Opportunities for interoperability arise where interconnections with external parties create greater value for customers and service providers than a single mobile money service provider can create alone. Interoperability through partnerships and interconnections can contribute to a greater mobile money ecosystem. According to Camner (2012), there are three main benefits that can be realized through greater interoperability, including: 1) Product innovation beyond domestic remittances and airtime top-ups; 2) Enabling cost-efficient payments to and from the unbanked population and; 3) Replacing cash with electronic means of payment in day-to-day transactions.

1.3.2 Mobile Money in Rwanda

East African countries, especially Kenya, have successfully adopted mobile money platforms since their inception in the early 2000s. Though Rwanda started using mobile money in 2010, a bit later than others in the East Africa Community (EAC), the number of active mobile phone subscriptions as of June 2019 was 9,040,327 or approximately 74.8% of the total population (Mwai, 2019). There are only two mobile carriers operating within Rwanda: MTN and Airtel-Tigo. As of June 2019, of the total number of active mobile subscriptions (active subscriptions refer to the number of SIM cards that generated revenues to the operator within 90 days) in Rwanda, 54% are with MTN and 46% are with Airtel-Tigo.

In Rwanda, mobile money services are generally used for person-to-person (P2P) transfers, basic bill payment (e.g. electricity), and money storage. Although financial inclusion in Rwanda stands at 81% as per the 2016 Finscope survey report (Access to Finance Rwanda [AFR], 2016), the use of DFS by adults is only 46%, with over 89% preferring to use cash in transactions as opposed to electronic means. Another concern is that customers simply use their accounts to receive money, after which they withdraw it all in cash. Mobile wallets have been seen as one of the strategies to increase the uptake of DFS by low-income people in rural areas (AFR Website). For example, they are used by savings groups to push money into a group wallet and get small loans from the group wallet to individual wallets. Mobile money has made a significant contribution to the 42% of people formally included through non-bank institutions due to the ease of access of end customers to cash in and cash-out points, and cheaper personal mobile phones.

1.3.3 Rwanda's Regulatory Environment

The Rwandan government Vision 2020 envisions the development of the financial and technology sectors as key to the transformation of Rwanda into a knowledge-based middle-income country. One strategy that was meant to achieve the goal of 90% financial inclusion among adults by 2020

was the development of inclusive and interoperable payment systems. MTN introduced mobile money in Rwanda in 2010, followed by Tigo in 2011 and Airtel in 2013. Currently, financial services are most commonly accessed through SACCOs and mobile money platforms, both of which are regulated by the National Bank of Rwanda (BNR). Mobile money is regulated by the National Bank of Rwanda (BNR) under the Payment Systems Law of 2010 which gives them oversight and authority of both bank and non-bank financial institutions. Since SACCOs are microfinance institutions, they are regulated by both Rwanda Cooperative Agency (RCA) and BNR where RCA is in charge of capacity development, research, promotion and development.

The regulation of mobile money agents and agent networks is crucial in developing the growth and sustainability of mobile money in Rwanda. Carriers invest a significant amount of time and resources in recruiting, training, and monitoring agents. BNR follows a policy of non-exclusivity for mobile money agents, meaning that agents may serve more than one operator (e.g. an agent can work for both MTN and Airtel at the same time). Potential challenges as a result of this regulation are that the investment in the recruitment and training of an agent may now be enjoyed by competitors at no cost to them. Argent et al (2013) report that this creates powerful incentives against large-scale agent networks which have been an important factor in the success of systems like M-PESA in Kenya. Further, non-exclusivity presents challenges in monitoring fraud or misconduct among agents. MNOs are responsible for training their agents and are liable for their actions (ifc.org).

1.4 Problem Statement and Purpose of Study

Mobile money has gained prominence in Africa as a strategy of financial inclusion among the unbanked population. As noted by McKinsey and Company (2017) mobile money has become an important component of Africa’s financial services landscape with one in ten African adults having an active mobile money account. Many financial institutions are therefore finding value in forging partnerships with mobile network operators in order to compete for the mobile money customer. In East Africa and Ghana, penetration of mobile money accounts exceeds 1,000 per 1,000 adults. These countries are therefore termed as mature markets (McKinsey and Company, 2017). It is also noteworthy from this article that some consumers hold more than one MFS account in order to circumvent limitations on interoperability.

In Rwanda, as part of the Vision 2020 development plan, the government sees an inclusive and interoperable payments system as a key strategy to meet financial inclusion targets (finclusion.org). Towards this end, banks and mobile money providers have made efforts to form bilateral agreements to facilitate transfers between mobile money accounts and bank accounts. Although mobile phone accessibility is high in Rwanda, and increasing even among rural populations (AFR, 2016), there is scanty evidence on accessibility to mobile phones translating to increased uptake⁵ of mobile money services. Furthermore, there is little evidence on challenges that are associated with

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5. Uptake is often used interchangeably with adoption and refers to the initial action of adopting the service. It does not consider the continuity of use (Wamuyu, 2014)

access⁶ and usage⁷ of mobile money services.

The divergence between access to mobile phones and adoption of mobile money service may be associated with myriad of challenges experienced by mobile money subscribers which include poor network coverage, high transaction costs, and lack of digital literacy and comfort with financial technology. To promote the adoption of mobile payment solutions, there is a need to explore which demand and supply factors hinder mobile money usage and identify the opportunities that exist and those that need to be harnessed. For the rural population where banking services are either unavailable or far away, making a case for mobile money services will provide an opportunity to improve their bankability by being able to remotely connect to their bank accounts while including them in the cashless economy.

Following the initiative by AFR, the SACCOs investigated in this project have installed automated disbursement systems in an attempt to incorporate mobile payment solutions in their service to customers. The system enables SACCO management to disburse salaries to their members (tea farmers and pickers) via mobile money. Those signed up for digital payments are able to pull their funds directly from their SACCO account into their mobile money wallet using their mobile phones. SACCO members can spend money from their mobile wallet, but more often withdraw their entire balance and use cash. However, the rate of adoption for both SACCO management and the SACCO members has not been established since the automation. As noted by Technext (technext.ng), the COVID-19 pandemic provided an opportunity for growth in mobile money services in Rwanda following a new set of policies initiated by the National Bank of Rwanda (BNR) that waived mobile money transaction costs. This led to a 100% increase in the volume of mobile money transaction nationally and it is of interest to explore if the same trend was observed among members of the tea SACCOs.

This research therefore investigates whether automation led to adoption of mobile money services for SACCO members, and to understand the benefits and limitations that exist in SACCO members' path to mobile money adoption. In particular, through this mobile money study, the research team in collaboration with AFR and USAID seek to understand the financial lives of members of SACCOs in the tea sector and how different stakeholders in the value chain are supporting mobile money use in Rwanda. The purpose of this research is therefore to explore the opportunities, challenges, and spillovers of transitioning agricultural SACCOs to a mobile money payment system.



6. Although ownership of mobile phones and mobile money accounts has been used as an indicator to accessibility to mobile phone services (Wieser and Bruhn, October 21, 2019), the two are not the same. Accessibility goes beyond the mere ownership and considers other barriers such as affordability of the service and other geographical and technical barriers which may inhibit accessibility of the service global and influenced

7. Usage of mobile money services refers to both the frequency and purposes of mobile money transactions (Frederick. 2014)

1.5 Scope of Study

This study focuses on two tea SACCOs: MTG Ishema SACCO in Gicumbi and Shagasha Tea SACCO in Rusizi, both of which are part of a total of eight tea SACCOs in Rwanda as reported by Rwanda Cooperative Agency (RCA). As elaborated by RCA in an interview, there are 21 tea cooperatives through which all tea farmers market their produce. In the case of the tea farmers targeted in this research, they are members of four cooperatives: Coopthe Shagasha and Villa Geos Umacyagi Cooperative in Rusizi and Coopthe Mulindi and Coopthevem Cooperative in Gicumbi District. However, as clarified by RCA, it is not a requirement that every member of these cooperatives belong to a tea SACCO, but rather farmers are free to choose their banking institutions independent of the cooperatives. The tea pickers are not necessarily members of the cooperatives and not every tea picker belongs to the SACCO. For this reason, only tea farmers and pickers who are members of the SACCOs constitute the target group for the study. According to our research, *Ubudehe* categories 2 and 3 were most represented among tea SACCO members, with *Ubudehe* 1 (very poor) only being represented by 3 people.

1.5.1 Limitations

One of the main limitations in this study is the high tendency of shared phones such that most respondents own SIM cards but do not necessarily own a handset or the handset is shared among family members. For instance diary study respondents who indicated that they had no mobile phones had significant usage of mobile money services. This poses a limitation in determining the accessibility of mobile money services which seems to be actually higher than mobile phone ownership. To overcome this limitation, the study considered ownership of a SIM card as a proxy to ownership of mobile money accounts since all SIM cards in Rwanda are mobile money services enabled with a customer only being required to activate using a USSD code as gathered from the MNOs interviews. However, the researchers note that lack of a personal mobile phone may limit the frequency and volume of mobile money transactions.

Concern regarding the literacy rate raised by both the SACCOs and factory managers was a potential limitation to data collection for this study, especially where the farmers were expected to fill the diaries⁸ documenting their daily usage of mobile money. However, the regular follow-up eliminated the danger of forgetting to record transactions.

The COVID-19 restrictions prevented longer contact within the field sites to establish adequate rapport with diary study respondents. With such short interactions and the fact that there was no physical follow-up during the lockdown, it is possible that many respondents may have provided information on what they perceived to be the expected results from the study. In some of the cases,



8. In a diary study, qualitative information is collected by having participants record entries about their everyday lives in a log, diary or journal about the activity or experience being studied over a period of time (Sullivan, 2012)

it was not possible to do person-to-person interviews denying the research team the opportunity to assess emotions and attitudes through participatory observation. The restrictions also made it impossible to have a post-lockdown focus group, which would have provided more insights on how things may have changed due to the new policy measures affecting mobile money transaction costs. Physical accessibility of the research sites was also a challenge requiring the research team to travel for many hours, especially to Rusizi. This further limited the social interaction with respondents. Future studies should ensure longer contact within these field sites to establish adequate rapport with respondents.

Sampling in this study depended entirely on secondary information from SACCOs. It is notable that *ubudehe* 1 category was underrepresented in the sample which posed a challenge in analyzing this category. Given that these categories were not captured at the SACCO level, it was not possible to identify the categories prior to fieldwork to ensure a balance. The post-sampling self-reporting is what was used to capture the *ubudehe* categories.

Another limitation related to the sampling design is that given that the research design is primarily qualitative in nature, the sample used is small and non-representative. This limits the generalizability of the results to populations other than SACCO members.

2. Research Methodology

2.1 Research Design and Objectives

This research seeks to investigate the impact of newly automated mobile money payment systems implemented within tea farming SACCOs across two districts in rural Rwanda. The investigation adopts ethnographic and qualitative research methods to understand the emerging social impact and uptake of these systems, and explores whether such mobile payment structures can transform these SACCOs into innovative and efficient financial institutions. To investigate this, the project was guided by the following research questions:

1. How do demographic and socio-economic dynamics affect uptake of mobile money services in Rwanda?
2. What are the costs and benefits to farmers receiving funds in their mobile money?
3. What factors might limit access to and usage of mobile money services?
4. What are the value propositions on how different stakeholders can increase value for mobile services to users in the value chain?
5. What are potential ways to increase the value of mobile money payments in the lives of farmers?
6. What regulatory aspects need to be addressed to drive the growth and sustainability for mobile money in Rwanda?

2.1.1 COVID-19 Additions to Research Questions

The COVID-19 pandemic and international response disrupted the proposed research timeline, and had a direct impact on mobile payment systems in Rwanda. To better encourage digital transactions, telecommunication companies in Rwanda waived transaction fees for smaller transactions, aiming to reduce financial barriers to the payment system. On an individual level, people in Rwanda were required to use mobile payment platforms instead of cash and were also restricted in their ability to move around the country due to an aggressive lockdown nationwide.

As this project was directly dependent on understanding uptake and usage of mobile money, the above information required the following additional questions, which were added to the original research questions in April 2020:

1. What is the impact of the COVID-19 lockdown on individual and family financial expenditures?
2. How have respondents transformed spending habits and methods since the lockdown?
3. Has mobile money been utilized more by respondents since lockdown?
4. Has money flow been reduced for SACCOs, tea farmers, and pickers?
5. What is the impact of cash restrictions and mobile payment fee reductions on managing monthly expenses?

Following these routes of enquiry allowed us to not only investigate the efficiency of mobile payment systems in tea SACCOs, but also account for the dramatic social changes witnessed in 2020 due to the coronavirus pandemic.

2.2 Data Collection Methods and Sampling Techniques

This research was conducted among members of the two participating SACCOs and different stakeholder institutions within Kigali City, Rwanda. The primary respondents included tea farmers and tea pickers who were members of the participating SACCOs.

The main methods of data collection were qualitative in nature and included diary studies, focus group discussions, in-depth interviews with individual respondents and key informant interviews. To triangulate the information obtained from the diary studies, a quantitative survey was also conducted as well as documentary review of secondary data in the form of mobile money statements. Participatory observation was also used to triangulate key informant interviews. Each data collection method had a specific focus as explained below.

2.2.1 Diary Studies

Diary studies were used to identify which forms of payments were used by SACCO members. Thirty (30) respondents were chosen randomly (15 from MTG Ishema SACCO and 15 from Shagasha SACCO) to keep journals tracking which payment methods they used three days per week for

four months. Four rounds of diary study were conducted, with each round lasting three weeks. Diaries asked for information on name and contact information, *ubudehe* category, sex, age, marital status, occupation, household size, weekly income, weekly expenses, geographical location, and SACCO and Cooperative membership details. Each diary entry asked questions related to spending, payment methods, expenses, receiving money, and any associated fees. Training on how to keep these journals was conducted by the research team with the help of the translators. To ensure that the diaries were kept by respondents, the research assistants contacted the respondents weekly to check-in. During the COVID-19 disruptions, the research assistants phoned the participants three days per week and entered the information into the diaries.

2.2.2 Interviews

We used two types of interviews: individual and focus group interviews involving a diverse selection of respondents based on age, sex, *ubudehe* category, and occupation, from the people who had been recruited at the SACCOs in Rusizi and Mulindi field site visits. The occupations varied from tea farmers, pickers, mobile money agents⁹ and super agents¹⁰. The focus groups included approximately twenty (20) people. The individual in-depth interviews involved fourteen (14) respondents, six (6) from Rusizi and nine (9) from Mulindi. For the individual interviews, an attempt was made to select a mixture of high frequency and low frequency users and the interviews sought to gather information around their digital financial services attitude, behaviors, socio-economic context, and demographics. Each case was assessed through the entire supply chain to capture how different actors interact through the digital financial ecosystem. The inclusion of agents and super-agents was to facilitate a business model analysis.

All interviews were semi-structured and informal to encourage respondents to reflect on personal experiences with mobile money and included questions focusing on mobile phone ownership and penetration, perspectives on mobile money safety and trustworthiness, SACCO or Cooperative membership information, and opinions on costs incurred from using mobile money systems. The plan was to conduct two rounds of focus group discussions and face-to-face interviews by the research team with the assistance of translators. However, with COVID-19 restrictions interviews in Mulindi were conducted through telephone conversations.

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9. In this study, an agent is a person or business that is contracted to facilitate transactions for users at a commission including cash-in and cash-out, registration of new customers and frontline customer service (GSMA, 2010)

10. The definition of super-agent in this study is adopted from GSMA 2010 and includes both super-agents and master agents. According to GSMA, super-agent is defined as a business, sometimes a bank, which purchases electronic money from an MNO wholesale and then resells it to agents, who in turn sell it to users. On the other hand, a master agent is a person or business that purchases e-money from an MNO wholesale and then resells it to agents, who in turn sell it to users. Unlike a super-agent, master agents are responsible for managing the cash and electronic-value liquidity requirements of a particular group of agents.

2.2.3 Key Informant Interviews

With the assistance of AFR and USAID, the research team identified key stakeholders associated with digital financial services and SACCOs. These included two mobile money operators (MTN and Airtel-Tigo); two financial institutions that offer digital financial services (a commercial bank and a microfinance institution); Rwanda Cooperative Agency (RCA); and National Bank of Rwanda (BNR). In addition, the two participating SACCOs and the four cooperatives associated with them were also interviewed as key informants. Given the role of the tea factories in this ecosystem, the factory managers and NAEB were also interviewed. A total of 14 key informant interviews were conducted.

2.2.4 Participant Observation

Participant observation was done in a limited capacity while visiting the SACCOs and collecting other forms of data. To validate the observed activities, the research team spoke with the administrative and managerial staff at the SACCOs while observing day to day activities to understand their perspectives and experiences with the automated SACCO operations. This information supported understanding of both the positives and negatives in the mobile payment system, and added further context to the SACCO member respondent interviews.

2.2.5: Quantitative Data

To triangulate the diary studies, a qualitative survey was conducted among forty three (43) focus group participants with survey questions related to their use of mobile money. All the diary study respondents were also requested to provide their mobile money statements for six months, the period of this research study.

The main sampling approach used to invite farmers and pickers to the interviews was simple random sampling from an initial list of SACCO members obtained from the SACCO management. An initial screening was done through a questionnaire to ensure the selection of participants would be balanced in terms of diverse characteristics of the respondents including *ubudehe* category, gender, marital status, and age. Another important characteristic was the respondents' occupation which also had implications on their economic status given that tea farmers are expected to be more economically empowered than tea pickers. To ensure a balance, respondents who were invited to the SACCO office were asked their occupation so that the number that reported at the SACCO office was equally split between tea farmers and tea pickers. However, when one group was underrepresented, usually the tea pickers, an effort to fill up the gap was made through snow-ball sampling. The research team then purposely identified diary study and in-depth interview participants and the remaining participated in the focus group and qualitative survey. For key informant interviews, respondents were selected through purposive sampling technique with the assistance of AFR and USAID.

2.3 Revisions to Data Collection Following COVID-19 Outbreak and Lockdown

Following the outbreak of the COVID-19 pandemic and lockdown, the Government of Rwanda and telecommunication companies encouraged mobile money usage in the country through removing transaction fees. The project had to be revised to encourage adequate response and consideration of these changes within the study. In order to keep track of spending changes, particularly from diary respondents, one extra round was added to capture the post-lockdown period.

Travel to field sites was restricted with the ban on travel between cities and provinces in Rwanda, meaning that correspondence with the field sites and respondents was halted for the period of the national lockdown. Follow-ups with the diary respondents had to be done through telephone correspondence, individual in-depth interviews were also done through telephone, and no additional focus groups discussions or interviews with respondents in rural areas could be conducted. Interviews with key informants and regulators were halted until after the lockdown was eased and when they resumed, most of the interviews were conducted virtually.

Interview guidelines and questions had to be adjusted in order to account for the impact of the COVID-19 outbreak on local spending, financial management, and social wellbeing. As the key informant interviews had not been completed before the start of the pandemic, additional questions were also written into the interview guides in order to understand both how the mobile money systems operated prior to COVID-19 lockdown and after. Collecting this information provided an invaluable perspective on the utility of mobile payment services during the time of the pandemic.

In order to explore the trends of diary study respondents, all respondents were asked to obtain a six-month mobile money statement from their providers. This data was to supplement the self-reporting in the diaries. Given that farmers were engaged in the project for four months and they were required to record data in the diaries, the research project paid a small facilitation fee through mobile money. The statements were also helpful in tracking the movement of this money in and out of the mobile money account, which provided behavioral insights.

2.4 Data Analysis

The data analysis methods used in this study were a combination of quantitative and qualitative analysis given the different types of data collected. For quantitative analysis, descriptive analysis was conducted using frequencies and cross-tabulation with SPSS 22 software. Cross-tabulation was particularly useful in establishing the association between different attributes, especially how demographic characteristics are associated with the uptake of mobile services. For quantitative data, both tables and graphs were generated using Microsoft Excel. The qualitative analytical methods included content analysis and discourse critical analysis. Content analysis was used for the diary study data, where codes were extracted using NVIVO and qualitatively analyzed. Discourse analysis was used for data gathered through focus groups and in-depth interviews after which paraphrasing

and interpretation of content was done. Qualitative data analysis was done under the following themes:

1. Socio-economic and demographic dynamics of respondents
2. Uptake and farmers experiences with mobile money
3. Benefits and opportunities of mobile money for farmers
4. Challenges and limitations to mobile money access
5. Value propositions on how different stakeholders can increase value to farmers
6. Regulatory aspects for growth and sustainability of mobile money in Rwanda
7. Effect of COVID-19 in mobile money experiences

A cross-cutting theme in this analysis is how COVID-19 impacted different aspects of this study for respondents. Qualitative data was presented as verbatim quotes from different respondents.

3. Key Findings

3.1 Research Question 1: How do demographic and socio-economic dynamics affect uptake of mobile money services in Rwanda?

The demographic dynamics of age and *ubudehe* category were the most significant factors influencing uptake of mobile money services. Older research participants were less trusting of mobile money services, agents, and platforms and were therefore less likely to use mobile money if not required. Older people preferred to use cash for a variety of reasons including security concerns given that they depend on either the agent or another family member to operate the service for them, requiring them to disclose their PIN numbers. Younger people, particularly from 15-35 years old were reported by agents to be the most common demographic using mobile money services. As gathered from the focus group discussion, *ubudehe* category and level of illiteracy also affected uptake of mobile money use because those on the more disadvantaged end of the classification could not afford, and were less willing to absorb, transaction fees as a part of their financial lives and were also less likely to own a mobile phone or SIM card. Further, there is a correlation between age and illiteracy (both digital and traditional) as confirmed by the focus group discussion and interviews with the factory managers which limit the use of mobile platforms. We found minimal differences in uptake between men and women although men tend to have better access to mobile phones as compared to women. This is also consistent with the views from agents who report serving more male customers than female.

3.2 Research Question 2: What are the costs and benefits to farmers receiving funds in their mobile money?

Mobile money systems streamline salary payments from the SACCOs to farmers and tea pickers. Users receiving payments would receive a notification as soon as the money is deposited. Receiving earnings digitally foregoes the need to travel to and wait in line at the SACCO, which may be far away and waste a great deal of valuable time. Queuing for cash payout from the SACCOs takes many hours, as can transportation there and back. Additionally, by using mobile money, the SACCOs reduce the volume of trips they would need to organize to disburse cash earnings to farmers in remote locations. This alleviates security concerns regarding traveling with large amounts of cash.

Despite a number of farmers and pickers indicating a tendency to withdraw cash rather than using mobile money for transactions, those who had adopted the payment system found that services and payments were easier and faster via mobile payments. Some farmers used mobile money to pay pickers. Expenses became easier to manage, and the system was often seen as trustworthy, especially if it was endorsed by the SACCO. Some respondents struggled with the availability of mobile money agents in their area, particularly in rural villages, and often withdrew cash to be able to pay for services and materials.

Users in Mulindi seemed more open to utilizing mobile payment infrastructures, keeping funds stored on their accounts both before and after the COVID-19 outbreak. Respondents in Rusizi were more skeptical and withdrew their money as soon as possible. This is partially due to the unpredictability of the network in this part of the country.

3.3 Research Question 3: What factors might limit access to and usage of the service?

The primary limiting factor reported by respondents working as tea farmers or pickers in both research locations was the high cost of transaction fees when using mobile money. In Rusizi, poor network connection was also mentioned as a key limitation in the ability to complete transactions. Additionally, the platform intended to connect SACCO accounts with mobile money wallets in Rusizi was frequently inoperable. While most mobile money transactions, excluding withdrawals, can be done by the user alone with their mobile phone through the self-help short-codes, we found that many people were going to mobile money agents to make transactions for them. However, there is a general lack of trust on the part of mobile money users toward agents and a significant limiting factor was not wanting to share password or PIN information with agents (due to risk of theft). This highlights a lack of digital literacy among many tea farmers/pickers which is prohibiting them from comfortably using mobile money services. Finally, another common limitation was agents frequently running out of cash, making withdrawals - the most common transaction - impossible to complete.

3.4 Research Question 4: What are the value propositions on how different stakeholders can increase value for mobile services to users in the value chain?

Mobile money providers have different business models with one player having a wider reach in the rural area which influences a low-cost structure associated with their services. The low-cost benefits are often negated by the poor network concerns raised by most of the users especially in Rusizi. For the competitor, while the telecommunication network is stronger, the cost-structure does not favor rural communities. As noted by BNR, the MNOs are independent business entities and a healthy level of competition is expected to be beneficial to the customers. The role of the regulator is therefore to create an environment for healthy competition while trying to eliminate unnecessary bottlenecks. The interoperability initiative offers an opportunity to eliminate these bottlenecks.

As indicated by the MNOs, having an external provider to oversee maintenance of satellite sites provides a level playing field such that mobile money providers only need to work on their internal systems to improve the customer experience for their subscribers. However, more work is needed to enhance reliability of the network in the rural areas

On the issue of cost structure, COVID-19 created an opportunity to explore the optimal costs for mobile money services given increased use during the no-transaction cost period. As explained by the respondents of MNOs, even when the costs were reintroduced (which were at lower rates than in the pre-COVID-19 period), the usage of mobile money services was still higher than pre-COVID-19 period.

Another regulation pushed by BNR is non-exclusivity of mobile money agents, which is expected to provide a benefit to clients by improving the availability and efficiency of agents. However, this regulation generates some dissatisfaction among the MNOs given the investment involved in building the capacity of the agents. Further, for an agent to be able to serve multiple MNOs, they need to have the capital base required by each MNO to be engaged as an agent, which is often a hindrance. One strategy to improve the availability and efficiency of agents is for financial institutions to become super agents (this has been tried by both commercial banks and SACCOs). In such a scenario, the agents are guaranteed enough float to serve their customers.

A proposition shared by most of the stakeholders is the need for providing comprehensive training at local level on how to use mobile money and the opportunities that exist in using the service. Although COVID-19 restrictions encouraged mobile money usage, changing the mindsets of customers regarding the safety and reliability of mobile money services should continue to be supported in order to build sustainability.

The increased usage of pull services from SACCO accounts to mobile wallets combined with

a positive attitude towards that service among SACCO members has created a demand for automation of other SACCOs. Automation is driven by RCA in collaboration with mobile money providers. Administratively, digital accounting of payroll at the SACCO level is now possible and has been made easier with increased mobile money transfers from the SACCO accounts to the mobile money wallet.

3.5 Research Question 5: What are potential ways to increase the value of mobile money payments in the lives of farmers?

Mobile money providers need to operate in an enabling regulatory environment and have the necessary assets in place, such as sufficient numbers of agents and available liquidity in rural areas. Several other elements that need to be in place to capture this business-to-person (B2P) opportunity include: offering bulk and real time payment tools and services, user education for all end users including farmers and agents, adequate mobile network coverage in rural areas amongst the farmers, and suitable marketing strategies. Additional strategies from the survey include: reducing or eliminating transaction fees; providing comprehensive training at the local level on how to use mobile money (including topics such as: security, comprehensive platform use, self-help services, financial literacy, and the roles of banks, agents, and SACCOs/Cooperatives); enabling stronger security protections for SIM cards, phones, and digital wallets; and providing mobile phones to members for free or at very low cost (using loans/payment plans with no interest).

3.6 Research Question 6: What regulatory aspects need to be addressed to drive the growth and sustainability for mobile money in Rwanda?

The National Bank of Rwanda (BNR) regulates payment systems for all financial intermediaries including SACCOs. However, other SACCO operations including capacity development are regulated by Rwanda Cooperative Agency (RCA) and Rwanda Utilities Regulatory Board (RURA) where self-help short-codes¹¹ are involved. The RCA is responsible for maintaining consistent representation, management, and membership standards across all cooperatives and SACCOs in Rwanda while BNR regulates financial functions. The mandates of the regulators are at times overlapping with the functions of the SACCOs and may limit activities such as training. For instance, the training programs as a whole do not seem to happen mainly because they need to be sanctioned by the RCA.

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11. These are operator's short codes that facilitate self-help services for different mobile money operations

4. Analysis and Discussion

4.1 Respondents' Demographic and Socio-Economic Characteristics

Three groups of participants were involved, including 30 diary respondents (15 from each district), 43 focus group participants distributed between the two districts, and 15 in-depth interview respondents (nine from Mulindi and six from Rusizi). The in-depth interview respondents were distributed equally between tea farmers, tea pickers, and agents while maintaining a balance in gender. The 43 focus group respondents also served as respondents in the quantitative survey. Table 1 presents the demographic characteristics of diary study and quantitative survey respondents.

Table 1: Demographic Characteristics of Respondents

Demographic Characteristics		Diary Study (%)	Quantitative Survey (%)
Ubudehe Category	First Category	13.3%	4.5%
	Second Category	40.0%	29.5%
	Third Category	46.7%	63.6%
Gender	Male	70.0%	62.8%
	Female	30.0%	37.2%
Age	20-29	26.7%	23.8%
	30-39	26.7%	35.7%
	40-49	13.3%	11.9%
	50-59	26.7%	14.3%
	60-69	10.0%	9.5%
	70 and Above	3.3%	4.8%
Marital Status	Single	16.7%	30.2%
	Married	75.0%	65.1%
	Widowed/Separated/ Divorced	8.3%	4.7%
Occupation	Tea Farmer	56.7%	34.9%
	Tea Picker	36.7%	41.9%
	Both	6.7%	23.3%

Source: Survey and diary study data

From the table, it is evident that the balance between the various demographic characteristics that were deemed important was mostly achieved. In terms of distribution of *ubudehe* category most respondents were in *ubudehe* 2 and 3. However, it was observed that the respondents who reported to be in *ubudehe* 1 also owned land which implies misclassification or misreporting of their economic status. Farmers from Coopthe Mulindi and Coopthe Rusizi Cooperative tend to be both

farmers and pickers. Apart from owning shares in the cooperatives, most of which are inherited, they are also employed as tea pickers by their cooperatives.

4.2 Income, Expenditure, and Household Size of Participants

Economic characteristics found to be of interest are weekly income and expenditures of the respondents as reported in Table 2. Given that expenditure is directly related to household size (measured by the number of people living full-time in the household), this variable was also explored and is also presented in Table 2.

Table 2: Respondents Weekly Income, Expenditure, and Household Size

Characteristic	Diary Studies	Quantitative Study
Respondent Average Weekly Income	9,000	11,000
Respondent Average Weekly Expenses	8,300	8,300
Most Common Pickers income bracket	2100-10000	2100-10000
Most Common Farmers income bracket	4100-10000	8100-18000
Most Common Pickers expenditure bracket	1000-7500	1600-6000
Most Common Farmers expenditure bracket	1600-10500	4600-12000
Most Common <i>Ubudehe</i> 2 income bracket	4100-8000	6100-8000
Most Common <i>Ubudehe</i> 3 income bracket	6100 - 18000	4100 - 10000
Most Common <i>Ubudehe</i> 2 expenditure bracket	1600-6000	4600-6000
Most Common <i>Ubudehe</i> 3 expenditure bracket	13100 - 15000	9100 - 21100
Respondents' average household members	5	6.6

Source: Survey and diary study data

Examining the results, the average weekly income was 9,000 Rwf for diary study participants and 11,000 for survey participants, while the weekly expenditure average was 8,300 Rwf for both groups. The household size average ranges from 5 to 7 members for both groups.

The difference between weekly income and weekly expenditures were minimal across the two SACCOs which may be due to the fact that the two tea factories are owned and managed by Timber Foundations and have the same payment structure for both farmers and tea pickers as confirmed by the two tea factory managers. However, there were notable differences between the income and expenditure of farmers and pickers which may be associated with their asset base. Farmers own land with the average farm size at 1.78 hectares, but pickers provide the farm labor. Further, the mean farm size occupied by tea was 0.287 hectares, and on average, 17% of the total

farm size was planted with tea. The average income for tea pickers in both tea SACCOs was 18,538 Rwf per month with the minimum being 2,000 Rwf and the maximum being 52,000 Rwf.¹² Looking at the variations between *ubudehe* categories, *ubudehe* 3 had a higher expenditure and income bracket than *ubudehe* 2 which may be associated with their economic status. The number of *ubudehe* 1 respondents in the sample was negligible.

4.3 Socio-Economic Dynamics Influencing Uptake of Mobile Money Services

Literature on mobile money adoption suggests that two main factors are precursors to the uptake of mobile money services: ownership of a mobile phone and registration with a mobile money account. The two characteristics vary with several socio-economic factors such as age, individual incomes, and marital status, and by extension affect the uptake of mobile money services. Table 3 presents the interaction of various demographic factors with ownership of a mobile phone and registration of a mobile money account. The distinction is important because among rural households, there is a tendency for someone to have a mobile money-enabled SIM card without owning a personal mobile phone.

Table 3: Socio-Economic Dynamics and Uptake of Mobile Money Services - Diary Study Respondents

Socio-Economic factors		Own Mobile Phone (N=13)	Has a Mobile Money Account	
		One (N=30)	Both (N=10)	
<i>Ubudehe</i> Category	Second Category	38.5%	26.7%	40.0%
	Third Category	53.8%	30.0%	50.0%
Gender	Male	76.9%	43.3%	80.0%
	Female	23.1%	23.3%	20.0%
Age	20-29	23.1%	10.0%	30.0%
	30-39	30.8%	20.0%	20.0%
	40-49	23.1%	10.0%	10.0%
	50-59	7.7%	16.7%	30.0%
	60-69	15.4%	6.7%	10.0%
	70 and Above	0.0%	3.3%	0.0%
Marital Status	Single	28.6%	12.5%	16.7%
	Married	71.4%	54.2%	83.3%
	Widowed/Separated/Divorced	0.0%	8.3%	0.0%

Source: Diary study data

12. Pickers harvest an average of 30 kgs of tea per day and are paid between 36 – 45 Rwf per kilo as confirmed by both the respondents and factory managers

From the results, only 13 out of the 30 diary study participants reported owning a mobile phone, representing 43%. However, all 30 participants had at least one mobile money-enabled SIM card in their name. This was also confirmed with the mobile money statements obtained from the diary study respondents. One notable characteristic of the respondents was that they were able to access mobile money services either through their individual SIM cards or from a SIM card belonging to a family member. This translates to a high percentage of access to mobile money services. The results further show that more respondents in *ubudehe* 3 owned mobile phones compared with those in *ubudehe* 2.

All the respondents have at least one mobile money account - this was a pre-selection condition for all diary study participants. However, it is notable that 10 respondents (corresponding to 33% of all respondents) had multiple mobile money-enabled SIM cards. Of this number, 50% were in *ubudehe* 3 while 40% were in *ubudehe* 2. In terms of age, mobile phone ownership among younger respondents was higher than the older respondents. While age influences the ownership of mobile phones, the usage of mobile phones for mobile money transactions also depends on the economic power of the user. For instance one of the biggest users of the mobile payment network in Mulindi was a 70 year old farmer (see Annex 4) but at the same time there was a 72 year old farmer who did not own or use a mobile phone for transactions. In Rusizi one of the largest mobile money users was a 39 year old farmer (see Annex 2), while a 25 years picker hardly used the platform (see Annex 3). While gender of the respondent influences ownership of a mobile money account in favor of male respondents, it is not evident that gender influences mobile money usage. The results suggest that with no differences in ownership, the differences in usage may vanish as seen from the profiled respondents in Annex 2 and 4 where there were minimal differences in mobile money service uptake.

From this analysis, socioeconomic and demographic dynamics such as *ubudehe* category and age are associated with access to mobile phones, an important factor in accessing mobile money services (although no direct association with uptake of mobile money services was found). Further, it was observed that registration for mobile money service did not translate to usage of the service. This is explained by the fact that all SIM cards are enabled to be used for money services but the user needs to activate the service.

Given that the uptake of mobile money services is highly dependent on mobile phone penetration, we conducted an analysis of ownership of mobile phones (presented in Table 4).

From the analysis in Table 4, mobile phone penetration was found to be over 85% which agrees with the official figures as per the AFR (2016) Finscope Rwanda research which placed mobile phone penetration at 84%. The penetration for respondents in *ubudehe* 3 was much higher than that for *ubudehe* 2. Consistent with the findings from diary study respondents, the respondents who did not own mobile phones had a SIM card which they used in a borrowed mobile phone either from friends or family members. This also varies across the *ubudehe* categories as shown in Table 4, However, it is notable that in terms of the mobile money platform used by the respondents,

most of the participants were registered for both MTN MOMO and Tigo Cash with a percentage usage of 68% to 70%, respectively.

Table 4: Accessibility of Mobile Money Services - Survey Participants

Item	Percentage
I own a mobile phone (N = 42)	86%
I own a mobile phone - <i>Ubudehe</i> 2 (N = 13)	77%
I own a mobile phone - <i>Ubudehe</i> 3 (N = 28)	96%
I don't own a mobile phone but I have a SIM card in my name (N = 31)	11%
I don't own a mobile phone but I have a SIM card in my name - <i>Ubudehe</i> 2 (N = 8)	38%
I don't own a mobile phone but I have a SIM card in my name - <i>Ubudehe</i> 3 (N = 21)	5%
I borrow a phone from my family/friend to use with my SIM card (N = 32)	14%
I borrow a phone from my family/friend to use with my SIM card <i>Ubudehe</i> 2 (N = 8)	38%
I borrow a phone from my family/friend to use with my SIM card <i>Ubudehe</i> 3 (N = 22)	9%
I have a mobile money account in my name = 43)	91%
I have a mobile money account in my name - <i>Ubudehe</i> 2 (N = 13)	85%
I have a mobile money account in my name - <i>Ubudehe</i> 3 (N = 28)	96%
I receive money through a friend/family mobile money account (N = 34)	25%
I receive money through a friend/family mobile money account <i>Ubudehe</i> 2 (N = 10)	30%
I receive money through a friend/family mobile money account <i>Ubudehe</i> 3 (N = 23)	35%
I use MTN mobile money for my mobile money transactions (N = 42)	68%
I use Airtel-Tigo mobile money for my mobile money transactions (N = 40)	70.5%

Source: Survey data

While access to mobile money services remains quite high, we investigated whether access to mobile money services translates to usage. Table 5 presents the most common usages of mobile money services as per the quantitative data.

Table 5: Usage of Mobile Money Services - Survey Participants

Purpose for using Mobile Money	Percentage
I receive wages through mobile money (N=41)	18%
I receive wages through mobile money <i>Ubudehe</i> 2 (N=12)	17%
I receive wages through mobile money <i>Ubudehe</i> 3 (N=27)	19%
I use mobile wallet to transfer money from my SACCO account to my mobile money account (N=43)	82%
I use mobile wallet to transfer money from my SACCO account to my mobile money account <i>Ubudehe</i> 2 (N=13)	77%
I use mobile wallet to transfer money from my SACCO account to my mobile money account <i>Ubudehe</i> 3 (N=28)	86%
I send money to my family/friend through mobile money (N=41)	84%
I contribute to weddings/funerals through mobile money (N=40)	75%
I use mobile money to buy my own airtime (N=42)	75%
I use mobile money to buy airtime for family (N=42)	84%
I use mobile money to buy cashpower (N=43)	72%
I use mobile money to top up bus card (N=42)	22%
I use mobile money to pay bills	9%

Source: Survey data

From the table, it is evident that most of the respondents (over 80%) had recently used mobile money services to receive money. The most common usage was the pull services provided by the SACCO where 82% indicated to have used mobile money to transfer money from their SACCO accounts to their mobile money accounts. The use of pull services is more prevalent among *ubudehe* 3 as compared to *ubudehe* 2. This is also confirmed by the respondents of the diary study whereby the two most common sources of mobile money received were the SACCO, friends and relatives.

The money pulled from SACCO accounts was for wages and salaries which are usually paid directly to the SACCO accounts. Although only 18% of the respondents reported that they receive wages through mobile money, there was an increasing tendency to pay wages for tea pickers through mobile money especially during the COVID-19 lockdown and implies that mobile money is becoming an important mode for salary payments. Only one respondent (see Annex 4) consistently received money from business proceeds (payment of services and/or sales) in all rounds, and with another five respondents receiving money from business proceeds only once throughout the study.

Table 5 further reveals that 84% of the respondents used mobile money to purchase airtime either for themselves or family members, with respondents buying an average of Rwf 200 worth of airtime per week. In some instances, the respondents indicated that they received money in the form of airtime from friends or family. Another common use was sending money to friends and family with the level of usage being 84%. As gathered from the diary study, some of the money received was in

the form of a refund, loan, or gift from family and friends.

Other common uses of mobile money are contributions to weddings and funerals (75%) and buying electricity (73%). There are other mobile money services with significantly lower usage among respondents which include topping up bus cards (22%) and paying bills (9%). Emerging uses of mobile money include paying security charges, paying school fees and personal school expenses, paying workers as well as paying for emergencies like hospital bills. This high tendency for mobile money service usage among the members of these two SACCOs may be associated with the automation project.

Further exploration of mobile money usage in the diary study indicates that the frequency of use varies across the data collection rounds and *ubudehe* categories as reported in Table 6. From a total of 900 observations¹³ throughout the study, the volume of transactions increased with each round. As observed in Round 1, which is construed as the status quo in terms of mobile money usage given that there were no external factors in this round, the volume of transactions stood at 44% with an average daily number of transactions being 9 among 20 respondents. The volume of transactions increased to 59% in Round 2, 63% in Round 3, and 88% in Round 4, with an average daily number of transactions of 12, 19, and 26, respectively.

Table 6: Volume of Mobile Money Services across all Diary Study Rounds and *Ubudehe* Categories

Money Received on Mobile Money	Number of Transactions (%)	Average number of transactions per day
Round 1 (N=180)	44.4%	9
Round 2 (N=180)	58.9%	12
Round 3 (N=270)	63.0%	19
Round 4 (N=270)	87.8%	26
<i>Ubudehe</i> 1 (N=189)	78.3%	16
<i>Ubudehe</i> 2 (N=306)	62.7%	21
<i>Ubudehe</i> 3 (N=405)	62.2%	28

Source: Diary study data

The increase was significant in Round 2 and 3 because Round 2 was partially affected by the COVID-19 lockdown when the government implemented a directive to encourage mobile money transactions. During this period, all mobile money transaction fees were waived. The steady increase in the volume of transactions in Round 4, which was after the COVID-19 lockdown, is also

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13. Twenty respondents participated in Round 1 and Round 2 and were surveyed for three days each week for 3 weeks in each round. Thirty respondents participated in Round 1 and Round 2 and were surveyed for three days each week for 3 weeks in each round. The total number of observations is 900.

significant because the transaction costs were reinstated, although lower than in Round 1. The push for cashless payment is continuing with merchants required to provide information on how to make payments using mobile money and other cashless payment options and encourage use of cashless transactions for their customers. This research did not isolate which of these policy actions were responsible for this spike in the volume of transactions. The volume of transactions does not vary much across *ubudehe* categories although the average number of transactions per day is higher for *ubudehe* 3.

Given the increased use of the pull services between the SACCO account and the mobile wallet, we also sought to understand how long cash remained in the mobile wallet. This could serve as an indication of mobile money contributing to the saving culture of the respondents. Table 7 explores this through data on withdrawal, savings, and transactions through mobile money.

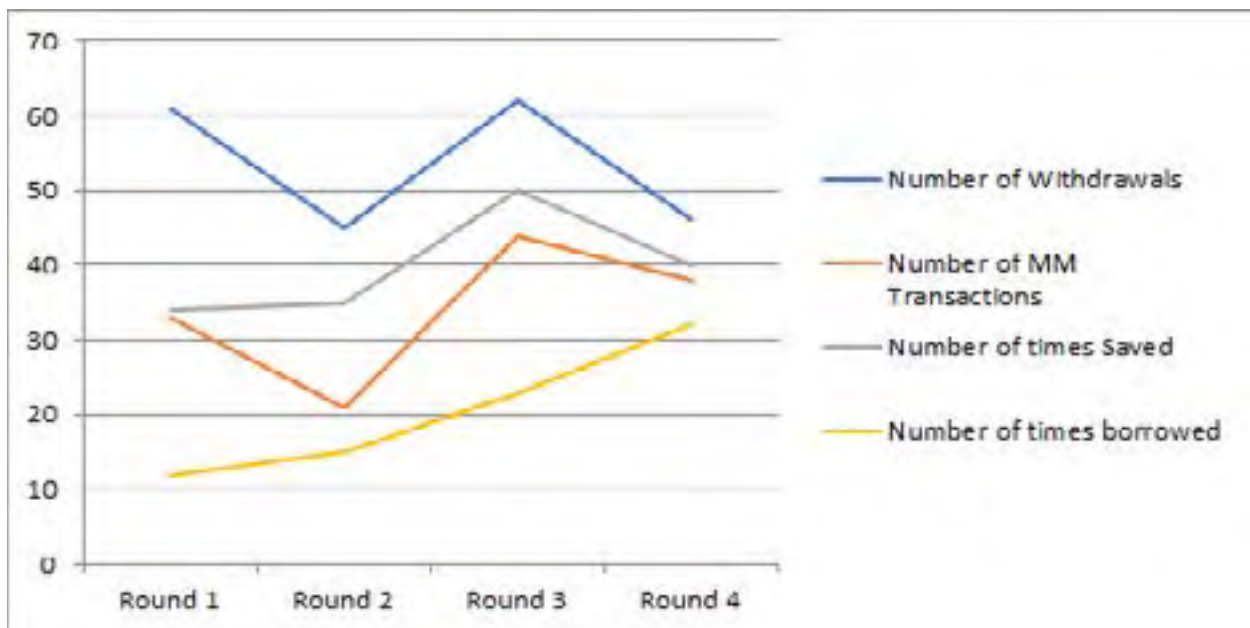
Table 7: Mobile Money and Financial Behavior

Item	Percentage
Did you withdraw any of the money you received? (N = 22)	95%
Did you withdraw any of the money you received? <i>Ubudehe</i> 2 (N = 43)	100%
Did you withdraw any of the money you received? <i>Ubudehe</i> 3 (N = 43)	93%
Did you do any transactions using mobile money platforms? (N = 13)	69%
Did you do any transactions using mobile money platforms? <i>Ubudehe</i> 2 (N = 6)	67%
Did you do any transactions using mobile money platforms <i>Ubudehe</i> 3? (N = 6)	67%
Have you saved any of the money you received? (N = 23)	74%
Have you saved any of the money you received? <i>Ubudehe</i> 2 (N = 8)	63%
Have you saved any of the money you received? <i>Ubudehe</i> 3 (N = 23)	86%
Saved on bank account (N = 23)	52%
Saved on mobile money accounts (N = 23)	57%
Saved in <i>Ibimina</i> or cooperative societies (N = 23)	78%
Saved in cash at home (N = 23)	26%
I prefer keeping cash (N = 43)	19%
I prefer keeping cash <i>Ubudehe</i> 2 (N = 8)	50%
I prefer keeping cash <i>Ubudehe</i> 3 (N = 8)	50%
I prefer keeping mobile money (N = 43)	74%
I prefer keeping mobile money <i>Ubudehe</i> 2 (N = 32)	22%
I prefer keeping mobile money <i>Ubudehe</i> 3 (N = 32)	75%

Source: Survey data

From the results, the level of cash withdrawal is very high and does not vary across *ubudehe* categories with most of the money withdrawn having been received as wage or salary from the SACCO. This same behavior was observed from the diary study respondents, which implies that most of the respondents used the mobile money wallet only as a basis of pulling money from the account after which it was withdrawn. Of the 23 respondents who reported saving the money they received, the majority preferred saving in *Ibimina* (an informal village credit and saving group) over saving in banks and mobile money. On the choice of whether to hold money in cash other than in mobile money, holding money in cash was less preferred. Looking at variations across *ubudehe* categories, preference for cash did not vary between *ubudehe* 2 and 3 but more respondents (75%) in *ubudehe* 3 preferred mobile money as compared with *ubudehe* 2 (22%). The reason given by a number of respondents was that it was easy to access money when you need it when it is in your mobile wallet, especially during the COVID-19 lockdown. However, for some respondents where the agents were not readily available, they had a tendency to withdraw money and keep it in cash. The daily use of mobile money for transactions was only reported by 13 respondents representing 18% of total respondents of which 69% reported to be using the service and there was not much variation across *ubudehe* categories. Most of those who used the mobile money service for transactions used it for purchasing airtime and paying electricity with a few using it for paying school fees and hospital bills. The results obtained from the diary studies are also comparable as evidenced by Figure 1.

Figure 1: Use of Mobile Money for Withdrawal, Saving, Transactions - Diary Study



Source: Diary study data

Consistent with the results in Table 7 for survey respondents, the level of withdrawal is higher than both mobile money transactions and savings. However, mobile money transactions exceed savings

in this data, unlike the quantitative data. The main reason given by diary study respondents for immediate withdrawal of money was that it was difficult to get an agent nearby when you needed them. Others said that the money received was too little to be saved.

An examination of mobile money statements for diary study respondents further revealed that most of the respondents withdraw almost all the money they received in their mobile money account either the same day or within 2 days of receipt. There is also a tendency of having multiple transactions of very small amounts on the same day especially when the source of money is from the SACCO account. There are more transactions at the beginning and middle of the month which corresponds to the payment schedules of the tea factories.

4.4: Benefits and Opportunities of Mobile Money for Farmers

The automation project was meant to solve the problem of SACCO members having to travel for long distances or wait in long queues at the SACCO offices or payment points (usually the tea buying centres) to receive their pay in cash during pay days. As reported by the factory managers, these long trips to payment points would mean that the tea pickers would not report to work twice per month (on pay days) leading to reduced quantity and quality of tea received at the tea factory. By integrating the bank system with the mobile payment system, SACCO members could pull their money from the SACCO account to their mobile wallet without having to go to the SACCO in person. As confirmed by one of the factory managers, the automation project was not only of benefit to the members of the SACCOs but to the factories as well since it meant more and better quality tea harvested.

Farmers and pickers overall expressed comfort with the automated system as payments were received consistently, faster, and directly without needing to commute into the SACCO for payment. They also got notified once their accounts were credited which was another benefit to clients.

“Whenever a transaction happens on my SACCO account, I get notified...I think it is simple and less costly in terms of transport and time. Like for example, from where I live to a bank, it costs me around 1000 Rwf on a moto[motorbike taxis], when on the other hand it would've cost me only around 260 RWF to withdraw using a mobile money account.”

- SACCO member

From the perspective of the SACCO management, after implementing mobile payment systems, financial disbursements were more efficient and manageable saving a lot of time for the SACCO staff. As noted by the manager of one of the SACCOs, “the digitization of the money flow aided accounting and tracking practices within the SACCO.”(SACCO Management interviewee) Managers and staff at the SACCO similarly expressed improved safety for their staff since they did not have to travel with large amounts of cash to disburse to members who could not travel to the SACCO.

Participants noted that the mobile money system provided them with an opportunity to send money to far places without having to travel there, also saving time. Having money in the mobile wallet also enabled some farmers to pay tea pickers from the phone while others paid school fees, bought electricity, paid government taxes and fees (including IREMBO services), and made health insurance payments.

“Using mobile money to buy power, you better use Tigo Cash. It’s an advantage to buy that way rather than withdrawing.”

- SACCO member

Paying these services via mobile money not only saves time but also eliminates withdrawal charges since some of these transactions are either free or attract a lower charge. Although a number of respondents preferred cash for some other services such as hospital bills and other daily expenses such as food at the market, there was an increase of the use of mobile money for some of these other transactions during and after the COVID-19 lockdown. However, respondents were concerned that very few merchants could accept mobile money for payment of goods and services, and therefore chose to withdraw cash in order to make purchases.

A number of the respondents interviewed expressed trust in mobile money services, although there were also expressions of distrust. Of those who expressed trust in the mobile money services, the main reason was that since the system had been implemented by the SACCO, it was a system on which they could depend. Others stated it was dependable because funds remained on your phone and you did not have to stress about carrying cash. For the many who chose to not use the system as a form of wealth storage or payments, their mobile money account was simply a means to receive payments and nothing else.

Access to a mobile money agent was another incentive to use mobile money services, although to many members, availability of the agents was a problem. Most of the respondents tend to use agents that are less than 20 minutes away. The most commonly used agents are those that are less than 10 minutes away. The agents who are more than 40 minutes away were used less frequently and by very few respondents. Most of the agents who were more than 40 minutes away were reported in Rusizi while those in Mulindi were mainly less than 20 minutes away. As a number of farmers and pickers expressed a desire to withdraw funds as cash as soon as funds were deposited, agent accessibility may sometimes limit any access to personal funds.

During the COVID-19 lockdown, the MNOs temporarily suspended all transaction fees associated with sending and receiving money and paying for goods using mobile money in response to a government directive which was part of the COVID-19 containment measures. The temporary removal of fees was widely regarded as positive by participants. Mulindi respondents who were interviewed after this implementation seemed to have increased the use of mobile money services, especially pulling their money from the SACCO account to the mobile money wallet.

Some were happier to keep funds in their phones, with one stating that “mobile money helps us with this Coronavirus” (SACCO member). For tea pickers who used to get mid-month payments in cash, money was now paid straight to their mobile phones during the COVID-19 lockdown and afterwards.

“Except for those whose salaries were considerably huge, but for the rest of us whose salaries were small, we would get our pay in cash but now it is through the phone.”

- SACCO member

Interviews with MNOs reveal that promotion of mobile money is seen as a business opportunity, and that MNOs are recognizing the need to train users on the use of mobile money services, particularly for the participating SACCOs in the rural areas. During a focus group, participants reported that “we have never received a lesson on how to use mobile money from anyone” (Focus group participant). Concerted efforts are currently being employed by both operators to provide financial literacy programs with the help of its strong distribution networks that includes regional managers, sales representatives, field personnel and franchise teams. From the perspective of one MNO, some of the community outreach strategies include use of community radio, awareness campaigns during market days, and outreach during Umuganda (obligatory community service days), especially when there is a need to work with local leaders and authorities.

4.5: Challenges and Limitations to Mobile Money Access

The most frequently reported challenges to mobile money use by respondents were related to mobile money agents. Three issues came up frequently: lack of enough “float”¹⁴ or cash on hand available for customers to make withdrawals; agent availability (proximity to customers); and trust among customers toward agents. As stated by the agents interviewed, if their cash floats were insufficient to provide services requested, they would either get a temporary loan from another trader in the market area where they worked or get assistance and support from their super-agents. However, this can take additional time and energy and the customer then must wait. One agent interviewed in Rusizi reported ‘I run out of cash 3-5 times per week because I transact between 300,000 - 500,000 Rwf in withdrawals, but only 100,000 Rwf in deposits’ (mobile money agent). From the diary study, it is evident that most of the users had access to only one mobile money agent throughout the four rounds of data collection which may imply that there is a shortage of mobile money agents to serve farmers. If this is the case, the agent is likely to exhaust float and impede the usage of mobile money. The distance and time needed to reach an agent was also cited as a hindrance. Most of the agents used by Mulindi respondents are between 10-20 minutes walking distance away on average while those in Rusizi are between 20-40 minutes away. Walking to the nearest agent can be prevented by things like rain or unanticipated events such as the COVID-19 lockdown. In some instances, there is overdependence on agents, especially for older respondents

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14. A metric used to measure the liquidity of an agent is the sum of their e-money and cash balances (GSMA, 2010)

who reported going to an agent for almost every transaction, whether or not the transaction required an agent. This made them more vulnerable to agent related challenges.

Another commonly reported access and usage limitation cited during our research was transaction fees being too high and/or too frequent. Additionally, the fee structure is not well understood by users. For example, one farmer in Rusizi reported getting a notification costs members 300 Rwf, while a tea picker in Mulindi said the notification service is free, but the charges go to RRA. This creates the impression that some of the participants did not understand the cost structure of the mobile money service provided by the SACCO, which may be a disincentive to use mobile money services. Transaction fees vary depending on the type of service and also increase as the amount of money being sent increases, thus discouraging people from using mobile money to make larger transactions. Feelings about transaction fees differed based on income level, with lower earners far more concerned about transaction fees than higher earners. This is evident from the fact that farmers did more mobile money transactions compared to tea pickers. RCA confirmed that there were complaints from the SACCO members at the beginning of the automation project which were associated with multiple charges by both the SACCO and the mobile money providers which made mobile money transactions too expensive. This made them limit the number of transactions made so as to avoid paying many fees. This is also observable from the fact that the most common mobile money transaction is buying of airtime which is free.

Poor network connection was also cited as a significant factor limiting mobile money use among people, particularly in Rusizi. As cited by some respondents, losing connection may happen in the middle of a transaction and customers are often left to wonder where their money has gone, as it may have been transferred out of the bank account but not yet reached the intended recipient. Clients choose networks based on perceptions of cost and network reliability¹⁵.

Another main challenge was the issue of insecurity associated with mobile money services. For the aged and illiterate, they were faced with the issue of sharing of their PINs with agents or family members which created fear of a likelihood of their money being stolen especially when dealing with agents who were not well known to them. In some instances, respondents revealed that agents would inconsistently represent their funds and the amount that they could receive. They also expressed fear that phones could be stolen when they have money stored in their mobile wallets.

“In the bank they have security but on the phone they can steal your phone even if they do not know your password it will take you time to look for another SIM card, but when it is here on your SACCO account it has security”

- SACCO Member

Other security concerns were associated with the possibility of mobile wallets being hacked,

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15. MNOs have different competitive advantages. While one of the MNOs has a good and reliable network it is perceived to be more expensive, while the MNO who has more affordable costs is perceived to have a poor network that can be down for extended periods of time, preventing clients from doing anything on their phones.

difficulty in keeping an account of your incoming and outgoing transactions, and lack of protections for customers when something goes wrong or when money is lost.

However, according to RCA, the issue of sharing of passwords among the older SACCO members is not specific to mobile money as they also used to share passwords for their bank accounts. An innovation by MTG Ishema SACCO that provides SACCO agent kiosks which are managed by SACCO staff seems to be solving the issue of untrustworthy agents as expressed by one Tigo Cash agent who owns a kiosk (see Annex 5).

Another challenge highlighted by AFR is the high cost of smartphones which puts them out of reach to the majority of the rural population in Rwanda. At the onset of the automation project, members of the SACCO were provided with affordable mobile phones by Tigo but were required to pay by instalments. While this was expected to be an incentive to the SACCO members, most of the members did not take up the offer given that the instalments were to be deducted by the SACCO from their accounts. Others felt that they could access cheaper mobile phones from the market than the offer given by Tigo. According to AFR, this signals a negative attitude towards borrowing for assets and perceived consequences in case of default which may include listing with the Credit Reference Bureau (CRB).

4.6 Value Propositions on How Different Stakeholders Can Increase Value to Farmers

The integration of banking systems and mobile payment platforms provides an alternative to the brick and mortar branch system which has dominated the financial sector for some time now. This acceptance of mobile payments by both commercial banks and microfinance institutions has led to an increase in access and use of financial services in the rural areas, as per the perspective of the interviewed micro-finance institution (MFI). Although automating and integrating the banking system with the mobile money network is very expensive for MFIs, as admitted by the interviewed commercial bank, the integration presents an opportunity to improve the quality of services offered by the MFIs to their customers. This is especially true in the rural areas where brick and mortar branches are equally expensive to build and maintain when compared with mobile money integration.

Some of the key value propositions that emerged from this research include the following:

- Leveraging on the high mobile phone penetration: The high mobile phone penetration in Rwanda creates an opportunity, even in the rural areas, for both SACCOs and other MFIs to improve services for their clients. The fact that more young people own mobile phones should inspire the SACCOs and mobile money providers to innovate products that target the youth.
- The interoperability initiative: This initiative is geared towards creating an efficient mobile payment ecosystem that is beneficial to both service providers and the customers. It is expected to make it easier for customers both from the banking sector and those using

mobile money to transfer money from one medium to another, which in turn provides an avenue to promote the adoption of a cashless economy, as per the Government of Rwanda's development goals.

- Expansion of automation to other SACCOs: Based on the experience from these two SACCOs, especially during and after the COVID-19 lockdown, (MFIs) have an opportunity to use technology to serve their rural customers in a cost-effective way, while at the same time ensuring the sustainability of their businesses. Given that not all tea SACCOs are automated (as gathered from interviews with both AFR and RCA), there is a need to extend the services to other SACCOs serving rural communities. It should however be noted that the cost of automation remains inhibitive for MFIs, an issue that both Access to Finance Rwanda (AFR) and RCA may need to explore further. Dependence on external funding for automation may not be sustainable in the long run. When the entire process of automation and integration makes business sense to all players in the value chain, it will increase acceptability of the interoperability initiatives which is meant to ease transactions and ensure cost-effectiveness.
- Digital literacy training: As pointed out by the commercial bank respondent, training on new products is key especially among the rural communities who have little or inadequate financial literacy skills. There is a need for collaborative efforts between the MNOs and other stakeholders to ensure that the mobile money users benefit from the whole spectrum of the available services. Training will also reduce overdependence on mobile money agents.
- Cost-effectiveness of the mobile money services. The temporary waiver of transaction charges during the COVID-19 lockdown and the responsiveness of the volume of transactions (which was confirmed by both the financial institutions interviewed as well as the MNOs) provides an opportunity to explore the optimal transaction costs for mobile money services. This is especially so when it is observed that there was not much of a difference in the volume of transactions even after costs were reinstated (at a lower level compared to pre-COVID-19 transaction costs). Further, given the revelation that other agent networks such as SPENN offer cost-free transaction and payment services to their clients, MNOs need to examine their business models to understand why their transaction costs tend to inhibit uptake of mobile money services.
- Sustainable agent network. The study revealed that availability of float among agents is an important factor in sustaining the regular usage of mobile money services. Most of the respondents admitted that agents regularly run out of float and are not able to perform some of the transactions (this was also confirmed by the agents themselves). One promising approach to be explored is the promotion of master agents and super agents. The commercial bank accomplished this by offering super-agent services at a commission (paid by MNOs) to mobile money agents. A similar arrangement was observed at the SACCO level in Mulindi where the SACCO has its own agent who operates as a franchise to serve the SACCO customers. As has been the case with MPESA, having super-agents as franchises removes the burden of direct supervision from the MNOs (although they still have a monitoring role) and improves the efficiency of agents which has an implication on the quality of service.
- Merchant services: Another opportunity for collaboration between MNOs and financial institutions observed in the wake of COVID-19 is the ability for merchants and traders to transfer payments received in their wallets to their bank accounts. According to the bank's

respondent, this service has now grown from “only 2 or 3 merchants, to well over 600 registered merchants”(Commercial bank interviewee). More merchants should be encouraged to provide mobile money payment options in the rural areas.

- Enhancement of mobile network infrastructure: Given that network challenges are a great disincentive to mobile money usage, and the fact that antenna sites are controlled by a different company, not the mobile money providers, more investment by government appointed service providers should be done to ensure that the network is improved across the country for better mobile money services coverage.

4.7 Regulatory Aspects for Growth and Sustainability of Mobile Money in Rwanda

Although both BNR and RCA appreciate that both MNOs and SACCOs are independent business entities, there is need for some advocacy from the regulators to ensure that farmers are not overburdened in terms of transaction costs. In some cases, there is evidence of duplication of charges. For instance the SACCO will charge for its services that include sending notification as well as the pull services into the mobile wallet. On the other hand, there are charges associated with withdrawing the money in the mobile wallet. However, it is also evident that in some cases the customer did not understand the mobile money fee structure and feared losing money through utilizing the system (as explained by one of the agents). The COVID-19 lockdown however provided some insights on the effect of these transaction costs given that frequency and volume of transactions changed in response to the temporary removal of the costs.

A particular concern raised by SACCO managers, mobile money agents, and farmers/pickers is that there was no member training provided by the SACCO to educate them on the utility of services available through mobile money. It is for this reason that many farmers and pickers simply see mobile money as a means of receiving money rather than a method of payment which can be utilized in everyday life, or as a means of storing value and wealth. As SACCOs are required by RCA regulations to have any planned training approved and validated by RCA, it would seem that the regulation, in this instance, can be a hindrance towards allowing the necessary training and education which may encourage farmers and pickers to use mobile money. Reflecting on the value of RCA training regulations, one SACCO manager stated that:

“Perhaps the budget and capacity of RCA is not sufficient to ensure they can perform all of their [training] duties consistently and effectively. Training of mobile money use among cooperative and SACCO members, as well as the general public, is perhaps of greater importance in Rwanda considering historic relations which would affect trust and uncertainty.”

- SACCO management Interviewee

4.8: Effects of COVID-19 on Mobile Money Experiences

The respondents indicated that they felt the effect of waiving transaction fees for mobile money services that was done in the month of March and April due to the initial COVID-19 mitigation actions. For the majority of respondents, it was easy transferring money to their mobile wallets. They also indicated that it was easier to pay using mobile money rather than withdrawing cash, while others found sending money very easy and not expensive. The positive effects continued to be felt in Round 3 even after the transaction costs were reinstated.

As established from the diary studies, while mobile money transactions were dominated by buying airtime and occasionally sending and receiving money from friends and family, mobile money spending habits in Round 3 and 4 included using mobile money to pay for bills such as medical bills and school fees, to pay for business supplies, and to buy household supplies. There was also a steady increase in the frequency of pull services from the SACCO accounts to the mobile money wallet. There was a surge in the number of respondents who started using money more during the lockdown with the main activity being sending and receiving money. In Round 3 an average of 22 respondents sent money through mobile money while an average of 25 respondents sent money through mobile money in Round 4. The rate of receiving money on mobile money was lower compared to sending, with only 4-6 respondents indicating they received money in Round 3 and only 2-3 in Round 4.

Although there was an increase in the use of pull services by respondents, it was not possible to establish if some members still received money in cash given that a return to the field site was hindered by COVID-19 restrictions. The research team could not establish the perspective of SACCO management after the lockdown on how the waived transaction fees affected their operations since a return interview was also not possible.

5. Policy Implications and Other Opportunities for Digital Financial Services in Rwanda

This study has outlined benefits to the target group where mobile money platforms have emerged as a potential channel to streamline payment chains from factories to SACCOs and SACCOs to members especially in the rural areas. Future investment in digital financial platforms could be expanded to other SACCOs and MFIs as well as other worker cooperatives across the country.

The research has also revealed that integration with MNO platforms is usually limited to one operator. There is no mechanism to allow SACCOs or MFIs to engage with multiple MNOs.

Given that each MNO has its own competitive advantage as revealed in this study, an important consideration may be to partner and include both MNOs in future integration projects as a way of broadening accessibility of mobile money across Rwanda. Farmers and SACCOs would therefore be able to use the two platforms interchangeably depending on network coverage, accessibility, and affordability.

Security concerns which are mainly associated with trust for mobile money agents have also emerged as a hindrance to mobile money uptake. However, interpersonal trust relationships may be cultivated over time which requires an agent to remain in one location for a longer period and be capable of satisfying the customers. An opportunity therefore exists in initiatives such as SACCO-owned kiosks which can be a focus of future DFS investments. Some of these unique interpersonal issues related to trust need further investigation through an ethnographic research.

The study has also revealed that the digital financial ecosystem in Rwanda involves different regulatory bodies and other stakeholders who have different and in some instances overlapping mandates. For instance, capacity building which is regulated by RCA is also a mandate of the SACCOs and MNOs. The SACCOs will require an approval from RCA to conduct any training. There is therefore a need for a coordinated approach to mobile payment regulatory framework which may involve identifying and streamlining which regulating bodies or stakeholders are best placed to oversee different functions. Moving forward, a collaborative approach to such shared activities such as capacity building may be important to ensure that the mobile money platforms are successfully incorporated and used.

The automation of the SACCO banking systems and the integration of the same presented a hidden requirement that all members of the SACCO were required to adopt the mobile payment system; notwithstanding that many farmers expressed anxiety in needing to form relationships with agents and limited knowledge on mobile money functionality. This approach raises an issue of the sustainability of such projects especially where cooperative members are not required to be members of the SACCO and may choose to be members of any other SACCO. Further, most of the farmers and pickers reported that they also belonged to other SACCOs in addition the tea SACCOs (for instance dairy farmers SACCOs) given that they engage in other farming activities. There is therefore a need to develop a more inclusive approach taking into consideration different user dynamics especially in instances where different SACCOs may have different automation approaches. In this way, the users may feel to be more part of the solutions which will promote sustainability of such projects.

While this study has looked at micro-level challenges to accessibility of mobile money services, macro-oriented studies of mobile payments services that outline the accessibility of digital mobile payment systems among the poor and financially unreachable populations in the country may be required. Following an observation that some respondents had SIM cards but did not own a phone, it may be necessary for stakeholders including SACCOs and MNOs to develop mobile phone purchasing assistance projects to allow a greater accessibility of mobile phones and, in turn, mobile money.

6. Conclusion

6.1 Summary of Findings

This research found several benefits and challenges in mobile money use among actors present in the tea farming value chain in the regions and SACCOs investigated. Many of the main challenges cited by respondents were related to mobile money agents. Frequently, agents would run out of cash (agents reported some difficulty in keeping enough cash on hand to support customers), making it difficult for customers to withdraw cash when required. Finding an agent within close proximity in rural areas and villages was often difficult and the COVID-19 lockdown, weather, and other challenges made moving about to search for an agent impossible at times. Additionally, potential mobile money users felt conflicted about sharing sensitive information with agents to complete transactions. This highlights the fact that many users do not conduct transactions on their own, but instead rely on agents to help even if they are not essential to the transaction. Ultimately, many of the challenges reported could be easily resolved if mobile money users were able and willing to transact on their own using their own mobile phone without the intervention of agents, which would require training on how to use mobile money services. This could reduce overdependence on agents and increase mobile money transactions. These challenges were more frequently reported by older people who are less comfortable with technology in general, but especially that which may affect their financial lives.

Nevertheless, mobile money systems streamline payments throughout the entire tea supply chain, most notably between SACCOs and tea farmers and pickers. Salary payment previously took days to weeks to complete for large SACCOs and inefficiently wasted the time of all involved in order to get SACCO members paid each month. Payment via mobile wallets has increased time efficiency as well as administration and accounting efficiency for SACCOs. When all systems are online and working properly, payment between SACCO-farmer-picker is seamless, however issues of network and software problems often prevent this from happening, particularly in Rusizi where connectivity is unreliable. The removal of fees during the COVID-19 lockdown period in Rwanda was beneficial to farmers and pickers and significantly increased mobile money use, as a majority of respondents previously reported avoiding mobile money in part because of high transaction fees.

Regulation of mobile money in Rwanda seems to be functioning well and similarly to other countries in the region, however coordination between all regulating bodies needs to be a priority with clear and consistent guidance shared among groups. Regulators should involve SACCO and cooperative management from all sectors to ensure growth and sustainability of mobile payment systems as well as satisfaction to users.

6.2 Recommendations

- Both MNOs and SACCOs should consider providing a comprehensive digital financial training to avoid having to go to an agent and give out PIN and allow users to transact themselves. There is a need to consider literacy training in tandem with digital financial training. USAID, AFR and other actors in this space could consider supporting such a comprehensive training programme on mobile money services so as to address the digital literacy problems.
- To facilitate this, RCA could consider eliminating the necessity for training approvals so that there are fewer obstacles. Peer-to-peer training would be sufficient at the Cooperative or SACCO level.
- SACCO management should survey members who are not involved in the mobile money disbursement scheme. According to SACCO administrative staff, fewer than 10% of members were enrolled in the mobile money system, but all respondents surveyed in this study were members enrolled in this system.
- For USAID, AFR and other potential actors, follow up studies are probably necessary and should include more and diverse field sites not just limited to those affiliated to AFR automation projects.
- For RCA, in collaboration with USAID, AFR and other actors, there is a need to visit other non-tea SACCOs to see what systems they have been using, both urban and rural areas for comparison. Speaking to members of these SACCOs will clarify effective money transfer systems.
- For MNOs, there is a need to follow up on inconsistencies in network coverage and availability especially in Rusizi. Many respondents noted that the service was frequently out of use and took time to be repaired meaning they were unable to use the mobile money services during the periods of downtime.
- For SACCO management in collaboration with MNOs, it is important to follow up on issues with the platform which connects SACCO accounts to mobile money wallets. Respondents reported that there were frequent problems with this and though it had been looked at previously, it still is not working consistently.
- SACCOs should provide SACCO-specific kiosks to improve security and boost confidence in mobile money services. These should be placed in rural neighborhoods to reduce travel time to agents. Further, involving both MNOs in providing the mobile payment scheme for the SACCOs should be explored to see if they can make up for bad coverage in certain areas or assist with user training options.
- For USAID, AFR and other actors, there is need to narrow the scope of future research in the following ways:
 - Place primary focus on tea-SACCO members who have the mobile payment system in place. Interviewing both users and non-users of the mobile payment systems will allow further analysis and comparisons.
 - Remove focus from financial institutions such as banks and regulators who are not able to reflect on the usefulness of the tea-farming SACCO mobile disbursement systems.

- USAID, AFR and other actors could consider providing automation services to more SACCOs in diverse sectors and locations. This will help understand a broader array of experiences with mobile money use and uptake. It is also important to consider development support in improving the network infrastructure in remote districts.
- Given that there is a reasonable penetration of both mobile phones and mobile money, another useful consideration for USAID, AFR and other actors could be to pilot several targeted functionalities through encouragement designs so as to increase the benefits of mobile money users beyond the traditional functions. A starting point would be mobile payments and increasing the movement of money from mobile money wallets to bank accounts to encourage savings. For mobile payments, the number of merchants who are able to provide the service in the rural areas is limited and strategies to encourage the number of merchants providing the service should be explored.
- For MNOs, they should hire and train more mobile money agents. The goal should be at least one agent per umudugudu (smallest administrative unit). Including the use of super-agents as franchises in their business model will help to expand the mobile money usage among rural communities

6.3 Additional Questions Generated

Some of the other questions worth exploring that were beyond the scope of this study include:

- Has the government's alleviation of mobile payment fees encouraged a change in respondents' attitudes towards mobile payments? Are users able to utilize the system to any greater extent?
- How have COVID-19 related austerity measures changed farmers' and pickers' spending habits post-lockdown in Rwanda?
- What are the attitudes of tea-farming SACCO members who are not using the mobile payment systems? Are they supportive of the SACCO's choice to implement the system? What hinders them from being enrolled for the service?
- What are the gender dynamics of mobile money flows in these cases? Are results affected by any disproportionate skews in gender representation and relationships?

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Appendices

Annex 1

Box 1: Diary of a *Ubudehe* 3 Male Tea Picker in Mulindi

He received money from the SACCO for salary five times and once from a friend through mobile money throughout the project. He occasionally received airtime through his mobile phone. Other than the money received as salary and for participating in the project, the average receipt per transaction was less than 500 Rwf mainly as airtime. The mobile money provider used is the one working with the SACCO.

Money received from the project as facilitation for participating was withdrawn and stored in a bank. Other reasons for cash-out or withdrawal were to pay household bills, for paying school fees and emergencies such as medical bills, and for treating a sick animal. Cost of withdrawal was 100 – 400 Rwf on average.

Saving was mainly done through the SACCO account and as the respondent reported he cashed out from his mobile money wallet to save into his SACCO account

‘I cashed out 5,000 Rwf to save’

He used only one agent who was 10 minutes away.

The mobile money transactions reported by the respondent included money to buy household supplies, to pay for animal treatment, and pay school fees.

The only borrowing behavior reported was for emergencies from a friend.

The only mobile money challenge reported was a poor network connection.

Even after the onset of COVID-19, the respondent continued using cash and was not aware of the removal of transaction fees.

Annex 2

Box 2: Diary of a Ubudehe 1 Male farmer in Rusizi

From Round 1 to Round 4, the respondent consistently used both Tigo and MTN for mobile money transactions. She received her salary from the workplace and SACCO and pulled it to her mobile money wallet. She also received money from friends and family as a gift and in the form of airtime. She also received money from family in times of emergencies through mobile money.

'I received money to treat my son'

In Round 1 she received 9,500 Rwf, Round 2, 31,000 Rwf, in Round 3, she received 12,000 Rwf, and in Round 4, 18,000 Rwf, and the money was received from different mobile money providers. The main reason for withdrawal was for airtime, financial aiding, refund of borrowed money, and payment of household bills.

'I have transferred money to the neighbor who was the owner'

'Received money to pay other people'

The average cost of withdrawal was 100 – 400 Rwf.

The respondent used one agent consistently throughout the four rounds with three other agents being used occasionally. The agent most consistently used is 15 minutes away while the second is 30 minutes away. The respondent also used the pull service between the SACCO account and the mobile wallet.

The most frequent transaction through mobile money is purchase of airtime but the respondent also used mobile money to pay medical bills and transfer money to other people

'I used mobile money to send money to another person'.

The respondent used mobile money to pay household bills, buy electricity tokens, pay school fees, and for investment.

The respondent occasionally saved money in mobile money, SACCO, or in cash although the amount saved was less than 1000 Rwf in all cases.

'I save money on phone account'

The respondent regularly cashed out from the mobile money wallet and the amount varied with what was already in the wallet at the time. The money was cashed out for personal use and investment. On one occasion, the respondent associated the cashing out behavior to security concerns while at another instance it was due to unavailability of agents.

'I cash out for my security'.

'I cashed out because agents are not easy to get'

The only borrowing behavior observed with the respondent was for airtime.

The main mobile money challenges reported were unavailability of agents, long distances to agents, and poor network connection. The issue of lack of enough float was also a challenge.

'The other challenge is lack of enough money from the agents'

With the onset of COVID-19, the respondent frequently transferred money to the mobile money wallet whenever she needed it and also sent and received money using mobile money. The reason given was that it was not expensive and that it was easy to withdraw money from her SACCO account.

'I was transferring (money) every time I need it because it is not expensive'

The respondent also used mobile money to pay for food.

'I pay for food using mobile money'

Annex 3

Box 3: Diary Of A *Ubudehe* 1 Male Picker In Rusizi

He received money from the SACCO as wages and also occasionally as airtime. He also received money to buy food and to pay hospital bills. In Round 1, he only received 6000 Rwf but the amounts increased in Round 3 and 4 to 16,000 Rwf and 22,000 Rwf respectively.

He received from both networks interchangeably. He has one regular agent who is 30 minutes away.

He withdrew money from SACCO and deposited it into his mobile money account. He also withdrew money to pay for hospital bills, for financial aiding, and refund borrowed money. Other expenditures included treating a sick animal. Cost of withdrawal was 100 – 400 Rwf.

He saved the money received in mobile money and did not report any cash-out. The only borrowing behavior was in the form of airtime and to buy farming supplies.

The only mobile money transaction reported was buying airtime. Other uses of mobile money include buying farm supplies, financial aiding, and refunding borrowed money, as well as sending and receiving money.

His main mobile money challenge was long distance to agents. He also reported challenges in withdrawals during the COVID-19 lockdown.

'As we were confined, I cannot withdraw money'.

Another challenge is problems with network

'Saturday 9th may we have not received network all day'.

During the COVID 19-pandemic, he used a mobile money platform to send and receive and transfer money to the mobile wallet. He also started buying electricity tokens using mobilemoney because it was easy and not expensive.

Annex 4

Box 4: Diary of *Ubudehe* 2 Female Farmer in Mulindi

In Round 1 and 2 between March 2nd and April 9th the respondent received money from family friends and MTG Ishema SACCO.

'I received money from a family member as a gift'

'I received money from a friend as a refund'

'Received 15,000 Rwf from MTG ISHEMA as tea salary'

The total amount received in Round 2 was 49,500 Rwf.

The main mobile money transactions in Round 1 was buying airtime while in Round 2, it was airtime and purchasing household supplies.

In Round 3 between May 2nd and May 24th the respondent received money from family for household expenses, from the project as facilitation, and from clients. The total amount received in Round 3 was 94,500 Rwf and in Round 4 it was 77,500 Rwf.

The main mobile money transactions in Rounds 3 and 4 were buying airtime and purchasing her shop's supplies.

'I purchased shop's supplies of 113, 000 Rwf'

Uses both providers interchangeably

'I received 18,000 Rwf, from sales / 14,000 Rwf from sales'

'I received 15,000 Rwf from people I work with on a research'

The respondent uses both mobile money providers consistently for transactions.

'I received 16,000 Rwf from sales on both Tigo and MTN mobile money'

The main reasons for withdrawal in Rounds 1 and 2 were cash keeping and household bills with a cost of withdrawal ranging from 100-400 Rwf.

The main reasons for withdrawal in Rounds 3 and 4 was to purchase shop supplies with a cost of withdrawal ranging from 410-700 Rwf.

The respondent also used mobile money for saving and investment. The average weekly saving in Round 2 was 7,000 Rwf which was saved mainly in mobile money. In Rounds 3 and 4, the respondent saved a weekly average of 40,000 Rwf using mobile money.

The respondent used three different agents; the average distance to reach an agent was 30 minutes. The respondent's main challenge in the use of mobile money is the long distance to mobile money agent.

After the onset of COVID-19, the respondent reported an increase in mobile money usage which was associated with the waived transaction fees. It improved her operations and made money flow easily.

'I now purchase and pay with mobile money often and also accept mobile money payments from my clients'

'I pay with Tigo cash when I'm buying supplies for my shop and sometimes pay with mobile money (MOMO)'

She feels that the re-introduction of transaction fees is likely to reverse the changes observed.

'There's definitely a change but I think it's returning to how it used to be since the cost of sending and receiving have gone up'

'Before this fee-charging returned it was going well, but now I'm not sure'

'We are now returning to using cash'

'Now that no service is free, all those changes are extensively fading'

Annex 5

Box 5: SACCO Kiosks: Agent-Super Agent Model

My workstation is in YARAMBA Centre, near the market. I own the business but the Kiosk and SIM-card belongs to the SACCO. The SACCO is the super-agent. I have to keep enough money to serve my customers and if there's a need for more cash than what I have, I call SACCO since it is the super-agent and they bring it so I always have enough cash.

The SACCO gave us kiosks to work in, so we can serve their members. The SACCO put in place these kiosks to avoid and prevent any kinds of thefts related to mobile money system and services, and also for its members to have a trustworthy place to go about any of the challenges they may face in using mobile money

Most of the money we use in the business comes from SACCO. The SACCO pays us a commission and but we also receive monthly commissions from the MNOs.

I provide services like withdrawal and deposit services; registering clients SIM-cards in mobile money and linking farmers SIM-cards with their SACCO accounts. I sell airtime although I use my own SIM-card to sell airtime

The regular volume of transactions is Rwf 100,000 per day but during the payment period, it may get up to Rwf 1.5 million.

Main challenge is clients forgetting passwords. It may happen that a client transfers money from SACCO to TIGO Cash, and only to realize that he/she doesn't remember their password and I can't do anything about it. Even if you call at GICUMBI carrier center, they tell you that the request has to pass through Kigali first, which takes a long time. I give them (the user) my own money; keep their SACCO cashbook and SIM-card, then sort it out at the earliest convenience possible

On the challenge of long distance to reach an agent, I go to the field during the payment period to avoid unnecessary trips for them.

I educate my clients that it is better to use mobile money because it even helps them adopt the custom of saving.

Now that MTN has a MoMo Pay which is a smart idea, I am wondering if something like that wouldn't be feasible with TIGO too.