A Qualitative Exploration of Mobile Money in Ghana

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ABSTRACT

Access to formal financial services, or being financially included, allows individuals the opportunity to plan, save, and stabilize their financial lives. Financial inclusion has recently received higher priority due to its promise to improve financial well-being and, in turn, assist in the reduction of poverty on larger scales. The simultaneous success of M-Pesa, bolstered by the proliferation of mobile phone access, convinced many that mobile money would enable financial inclusion. However, with nuanced characteristics in each country and distinct financial systems and economy, mobile money adoption and usage is varied. In this paper, we evaluate the mobile money's viability as a vehicle for financial inclusion in the Southern region of Ghana. We report on qualitative interviews and observations from five different cities and surrounding small towns and evaluate individual financial practices, existing and projected needs for financial services, and the potential role of mobile money in fulfilling these goals.

CCS CONCEPTS

• **Human-centered computing** → Empirical studies in HCI;

KEYWORDS

Mobile Money; HCI4D; ICTD.

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1 INTRODUCTION

A well connected financial system is imperative to a country's economy, not only for facilitating economic transactions for the community as a whole, but also to serve as a vehicle for savings and long-term planning at the individual level. However, many low-income countries, especially in rural regions, do not have access to formal financial institutions for lack of infrastructure, funding, and oversight capabilities. It is reported that 2.2 billion people in the world do not have access to a traditional bank account. Of those people, 77% live on less than $2 a day [32]. Having to support a family on such an income, then, requires meticulous planning. In addition, the environments that such families operate in do not leave any room for error; a financial shock in any form can result in permanent poverty. Digital Financial Services - the use of technological financial solutions including, but not limited, to mobile money - can be enabled to engage this portion of the population and provide formal financial services to the unbanked.

As per the Center for Financial Inclusion, financial inclusion refers to a state in which i) everybody has access to a full suite of financial services including; credit, savings, insurance, and payments ii) Provided with quality; convenient, affordable, suitable, dignifying and client protection iii) To everyone who can use financial services; with special attention to rural people, people with disabilities, women, and other often-excluded groups iv) Through a diverse and competitive marketplace; a range of providers, robust financial infrastructure and clear regulatory framework [7].

Mobile money (or branchless banking), provides financial services using the existing cellular and distribution networks of Mobile Network Operators (MNOs) which are widespread. While the services associated with a financial account are rendered over a mobile device connected to their mobile wallet account, customers deposit and withdraw cash from these accounts through retailers or mobile money agents. USSD, SMS, and smartphone applications have all been used to access these services on mobile devices. However, with such nuanced characteristics in each country and even more distinctions within each financial system and economy, mobile money as a solution may not be applicable in every country aiming for financial inclusion in the same way.

Therefore, this research aims to primarily understand the financial needs and practices of Ghanaians, after which we evaluate the role mobile money may play in the context of these financial needs and practices. Using qualitative discussions with 25 individuals in five areas of Ghana as well as field observations and discussions, we attempt to understand the financial needs of individuals in Southern Ghana. We analyze the role that mobile money can or cannot play in those needs. In this research, the financial needs of people will be generally defined as what citizens use money for and how they pay/finance/budget for those costs. For our work, we focus on mobile money services - including USSD SIM based applications, smartphone- based applications and over-the-counter (OTC) transaction methods of mobile money.

The work discussed here uses two lens of inquiry. We began our research with an inquiry on why mobile money services in Ghana had not taken off. Despite Ghana being a DFS ready country - details mentioned in later sections - mobile money penetration in the country maintained lower rates than countries with less infrastructure in place [12]. To understand possible explanations for this lack of uptake, we looked at the potential barriers to uptake

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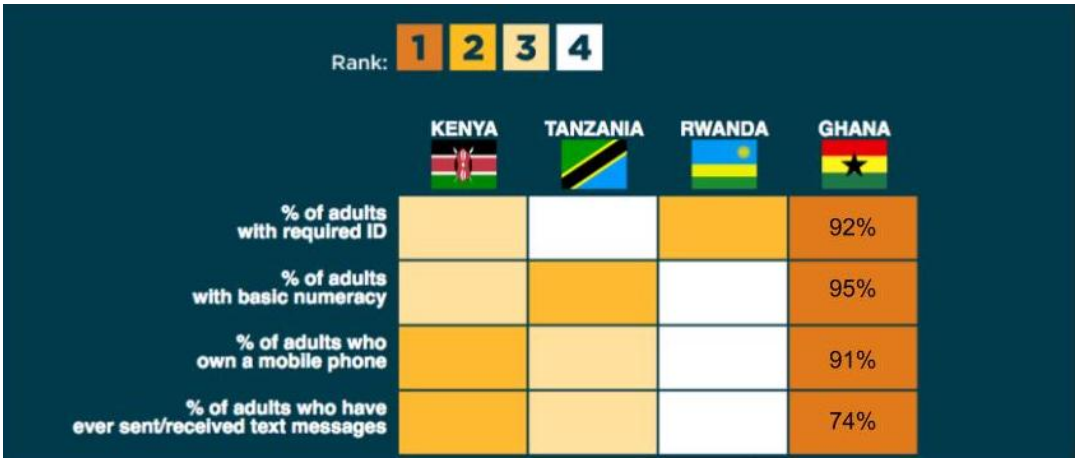

Figure 1: The graph by CGAP showing the comparison of prerequisites availability for Digital Financial Services in Kenya, Tanzania, Rwanda and Ghana

or continued use of Digital Financial Services, such as fee structures, security perceptions, and usability issues. Our second lens of inquiry resulted as an outcome of our initial conversations during the first phase. While discussing the various reasons for use and non-use, the researchers began to question whether the actual value-added services provided by Digital Financial Services live up to their promise of expanding financial inclusion.

Using qualitative discussions with 25 individuals in five areas of Ghana as well as field observations and ad-hoc discussions, we attempt to understand the financial needs of individuals in Southern Ghana. We analyze the role that mobile money can or cannot play in those needs. We use the term financial needs of people, defining it as what citizens use money for and how they pay/finance/budget for those costs. We observed that though mobile money is prevalent and mobile money accounts are widely owned, they were not being used by the population frequently or in ways predicted by mobile money service providers. We share various ways and reasons of use and non-use and discuss how the value addition is in the conversion of existing financial tasks and propose this as a possible metric for financial inclusion.

The rest of the paper is arranged as follows. We situate our work in the contextual financial inclusion status in Ghana. We then reflect on the existing literature around Digital Financial Services, giving special attention to works in Ghana in Section 2. We then explain our methodology in Section 3, followed by our observations and discussion in Section 4, ending with our conclusion.

1.1 Context and Motivation

Ghana is a country situated in the West of Africa with a population of more than 29 million [13] . The currency used is the Ghana Cedi and pesewa (1 Cedi = 100 pesewas) [34]. Though there are many languages spoken in the country, including Asante Twi, Ewe, and Fante Twi [8] , English has been the official language since 2010. The capital and the largest city is Accra, which is also one the of sites of our research.

Currently, there are six Mobile Network Operators (MNOs) in Ghana including Airtel Ghana, Expresso, Ghana Telecom (Vodafone), Glo Ghana, Millicom (Tigo) and Scancom Ghana (MTN) [26]. There are four mobile money players in Ghana, namely Tigo Cash, MTN Mobile Money, Vodafone Cash and Airtel Money. MTN is the largest and the oldest mobile money player in the market.

The Government of Ghana has been a proactive supporter of Digital Financial Services, introducing mobile money friendly regulations early on. In one such effort in 2008, the government introduced new regulations as a way to accelerate technological development in the mobile payments sector. That year in particular would make way for many regulations surrounding payments including the Anti-Money Laundering Act and the Pension Act [4]. The government, along with the Bank of Ghana, announced the new mobile money friendly regulation for branchless banking [2] to demonstrate forward-thinking regulations that would create an environment for successful technological integration. The government particularly wanted mobile money to proliferate and succeed after observing the widespread success of m-pesa in Kenya. According to the regulation, any mobile money service would have to be connected to a minimum of two to three banks [2]. However, this regulation in particular would make it more difficult for companies to invest due to the lack of willingness from banks to partner with smaller businesses. A a result, the government removed these requirements in 2015 due to its limitation of mobile money.

Ghana has always been uniquely positioned in the Digital Financial Services landscape. According to Financial Inclusion Insights (FII) - a periodic survey of the financial inclusion status in various countries [19] - Ghana has 48% of its population financially included, which includes both bank account holders and mobile money users. Out of the total population 34% own one or more bank accounts and 20% own a mobile money account, suggesting that there may be an overlap between bank account and mobile money users. The FII's National Survey report on Ghana [18] showed that Ghana has a relatively low mobile money usage even though it has the highest bank account sign-up among Kenya, Tanzania, Uganda, Rwanda and Ghana. Ghana also has a financially active population

with 59% of the population currently paying for Insurance, 67% actively saving and 40% of the population investing money [18]. This can be accounted for by the stable income in the country as it is reported that 75% of the country's population can cover basic expenses, put money into savings, and buy goods. 60% of its population sends or receives remittances, whereas DFS counts for 34% of these remittances [18].

In 2016, the Consultative Group to Assist the Poor (CGAP) did a comparison of four countries, Ghana, Kenya, Tanzania and Rwanda, based on the prerequisites to DFS ownership and usage based on 2014-2015 data. These prerequisites included required identification (helps with the Know-Your-Customer KYC requirements), basic numeracy (to interact digitally and manually with financial numbers), ownership of mobile phones (to use the mobile based services) and previous history of sending and receiving text messages (showing the ability to interact with texts and SMS). Figure 1 from that report [**?**] shows that Ghana outranks all of these countries on key dimensions of mobile money readiness and has all the prerequisites for active engagement of its population with mobile money services. Thus, given these facts, it was interesting to learn at the start of our research that mobile money had not 'taken off.' This founded the basis of our research.

According to the graph, shown in Figure 1, Ghana is positioned as one of highest in terms of meeting requirements, the country has 92% of its adults prepared with required ID and 95% of adults with the basic numeracy skills. In terms of access, 91% of adults owned a mobile phone. And in addition to all of these most basic requirements, 74% of adults had been reported to have sent or received at least one text message, referencing to a population that has the technical literacy that would ease or negate any transition needed to transition to using mobile money. On all four accounts, the country ranks the highest among all four countries surveyed. This is surprising given that Kenya's success with M-Pesa stands at a bare ranking of 2 on this mobile money readiness scale, while Ghana still struggled to have their DFS success in spite of their consistent ranking as first.

2 RELATED WORK

This research was broadly informed by existing literature on Digital Financial Services (DFS) in the field of Computer Science and Economics around mobile money and works in Ghana.

2.1 Computer Science & Digital Financial Services

Though there has been research in the field of Digital Financial Services by the Computer Science community, this research interest is still relatively new. In 2016, when this research was being started, our literature review showed that there were about 46 papers, broadly speaking, observing the various technological aspects of implementing Digital Financial Services in different forms. Included in these technological aspects were papers within the ICTD and Computer Science community about mobile banking [23, 29, 30], mobile money [21], financial inclusion [24], security [3, 5, 6, 9, 11, 25, 27, 28], infrastructure [14] and usability [16].

Though most of these works are around financial services or the use of technology in financial services, our work relates to a potential subset of those services and only the telecom provided mobile money offerings. Of the works within the ICTD and Computer Science community, the main papers covering the context of Ghana were Ghosh [15] observing the persistence of paper money in the economy in the context of microfinance and mobile banking (not to be confused with mobile money, these are mainly applications for the banks) and digitizing money transfers. This work in 2015 was still looking at the microfinance work of development. Also, even further back we see the ethnographic work done in 2013 [20] in rural Ghana to compare the three e-payment methods to optimize cash transfers and alleviate poverty. We examine these papers, mainly for their specificity to Ghana and their related exploration of uptake of a mobile version of cash. We were also inspired by [21] to look at ways mobile money can and cannot provide value to existing needs. Our work extends their learnings on understanding the existing context of mobile money services in Ghana.

2.2 Economics & Digital Financial Services

Related to the research in mobile money, we also looked at Economics journals which have explored mobile money uptake in the context of consumer behavior theory [33]. The work concludes that one of the main precedents to the wide adoption of mobile money to come down to trust and risk, as well as the perceived ease of use. In essence, they identify these as the main barriers for mobile money use and in the context of its publishing in 2010, only considers MTN and a small player that no longer exists. We can also look to another paper by Ignacio Mas on identifying the important components of scaling mobile money [22].

The works most related to our work are [17] and [1] which used surveys to look at the barriers forming the reasons for the lack of mobile money usage despite the high phone ownership and recognition of mobile money through advertisements. Though we do not take a deficit based approach in our work, we take inspiration from these works in understanding the reasons of lack of uptake among phone owners. We extend this work by adding additional barriers and reasons for these barriers through our work.

3 METHODOLOGY

Our first phase of research looked at the services already being offered and evaluated mobile money's ability to meet certain ends. However, we realized that a potential barrier/gap to uptake could be a mismatch between the mobile money services and the goals of end users. Thus, the goal of the second part was to understand and evaluate mobile money as a potential answer to the basic financial needs of Ghanaians. This part focused on identifying the financial needs of Ghanaians and understanding mobile money in the context of those needs and expanding financial inclusion.

Our study contributes to the knowledge about the use and non-use of mobile money services in Ghana. We used semi-structured interviews with men and women in five different locations, observations of these locations and the mobile money use of their populations to discuss the role that mobile money in playing in their lives.

Figure 2: The night market in (Accra) Ghana within the University of Ghana campus with where street vendors selling food and daily items.

3.1 Interviews

A total of 25 semi-structured interviews were conducted, out of which 10 were recorded with participants' consent, and 15 were not recorded. Handwritten notes were taken for these interviews based on the comfort and consent of the participants. The interviews and observations discussed in this research are done primarily by a young woman author who is of Korean-American descent and speaks fluent English. All interviews were conducted in English. The interviews took an average of ten minutes - with some interviews ending early within six minutes whereas some lasted up to twenty minutes. The interviewer had a list of talking points that we wanted to cover from each participant. However, we did not follow the same sequence as the conversation was based on the responses of the participants. Thus, all points might not have been covered with each respondent. None of the participants were compensated for their participation. However, the interviewers did purchase markets goods from a few market sellers prior to or after the conversation.

All the interview notes and recordings were then transcribed. Later the transcriptions were coded and clustered into themes. The findings shared in the next section are categorized based on the themes. All of this research was IRB approved.

3.1.1 Participant Recruitment. The researcher was part of the study abroad program and was accompanied by two professors, one of whom was local Ghanaian. The interview participants were recruited through two main mechanisms. The authors went to the field, in markets and public spaces and asked shopkeepers, vendors, and other individuals present there if they could be interviewed. In the second mechanism, the two professors who accompanied the authors were also requested to help in facilitating some interviews using their local contacts.

During the market field visit where participants were recruited on verbal request, it was observed that the interviewer ended up with talking to more men than women. One possible explanation could be the lack of presence of women in public spaces where the interviewer was recruiting from. A few of the participants had actually initiated conversations with the interviewer curious about the reasons for a visit to Ghana or questions being asked with other individuals. Upon talking more, they also agreed to participate in the interviews.

The place of interaction was usually a public place or a food stall where people were either waiting for their food or would stand at long tables and talk while eating food. Our field observations revealed that Ghana generally is a relatively relaxed and friendly society and all interactions, including with those who could not participate, were very courteous and friendly. Using this method we recruited participants including students, mobile money agents, food vendors, and merchants. Though all interviews were conducted in English, for a couple of the interviews a local had to assist the interviewer with certain words. For example, the woman at the market did not speak English and her daughter assisted in our limited conversation. Similarly, one woman at the blanket making activity also used the help of a translator.

We also went to the business of interest in the cities we stayed in, to get a sense of mobile money market and talk to people who were directly related to mobile money as a profession rather than end users.

For the interviews that were pre-arranged with the help of the professor, the meetings were also varied including a mobile money shop owner, a local male school teacher and a female nurse from a small village. During the program, the author also went to a fabric-making activity on a small property and talked to a woman cloth-maker who used to go into town once or twice every week to sell her products at the farmers market.

3.1.2 Participant Details. The participants were from a variety of different socioeconomic backgrounds, occupations, and spending levels in the Southern cities of Ghana. The interviews were conducted in five sites including the urban areas of Accra, Kumasi, Cape Coast and rural areas of Ada, Ho and smaller towns surrounding these five areas. The participants were aged between 18 - 50 and were interviewed in a semi-structured manner. Of the 25 participants, 15 were men and 10 were women. 16 of the 25 interviewees were urban respondents with the remaining individuals being rural area residents. The participants were mostly employed individuals, small business owners, sole business owners like mobile money stores or mobile repair shops, women who ran a fabric-making workshop and sold them at markets, street vendors and fixed shop vendors engaged in a form of trade selling at markets. More participant details can be seen in Table 1.

The interviews were done all throughout the day including later in the day when out in the market. It was observed that the time of the day was not as big a component in the participant engagement as was the ways of introduction to the participants i.e via the professors' pre-recruitment or engaging in conversations in the market. Most of the participants were proficient in English and were comfortable conversing in English for the entire conversation. However, it was also observed that for some of the participants the difficulty with long conversations was due to the language problem.

4 OBSERVATIONS AND DISCUSSION

In this paper our goal has been to look at the existing mobile money structures and services as well as the existing needs and practices of

Gender	Age	Rural or Urban	Phone Type	No. of Sims	Mobile Money Operator
Male : 15 Female: 10	18 to 29 : 8 30 to 39 : 6 40 to 50 : 11	Rural : 9 Urban : 16	Smartphone : 12 Feature Phone: 13	One: 4 More than One: 21	MTN: 22 Tigo : 7 Vodafone: 9 Airtel: 7

Table 1: Participant demographic, phone access and mobile money usage details

users. We attempt to investigate and understand the lack of uptake of mobile money services in Ghana, as reported by the literature review. We also focus on the existing financial needs of the end users and how mobile money services fit to meet these needs. In this section we will present our observations and findings from the field interviews, while also discussing their implications and possible reasons alongside.

All of the 25 participants of interviews were conversationally fluent in English and owned mobile money accounts. The participants had a mix of feature and smartphones and used 1 or 2 SIM cards, where two SIM cards was a popular choice as can be seen in Table 1. While there was no formal criteria or prerequisite for the interview participant recruitment, it was interesting to see that all of our participants owned phones and mobile money accounts. Listed below are our findings from the semi-structured interviews and field observations.

4.1 Literature-Field Gap

Our first finding from the field visits was identifying the large gap between the literature accessible through digital means and the reality. The state of the computer science literature relating to the mobile money deployments in Ghana, as we define mobile money, was and continues to be limited. As such we relied on consultancy reports to guide our understanding of the current state of mobile money in the country. Much of the writings were focused on the narrative that while Ghana is ripe for the success of mobile money (DFS-ready) as explained in Section 1, it had yet to catch on. With this in mind, we structured a portion of our study to focus on what barriers were holding back the potential for widespread uptake of the mobile money service. However, once the first author arrived in the country and began the interviews, there was a different narrative altogether.

The CEO of Consumer Bureau, a consulting group and e-commerce platform in Ghana, shared that *"About 60 to 70% of people are now leveraging the mobile money payment system to buy products. [The use of] mobile money grew exponentially this year [2016]".*

"We have a lot of customers. A day we record more than 200 customers" - (Mobile Money Shop Owner, Ada)

In the time between the aforementioned consultancy papers and the first author's visit, mobile money had exploded. It is only now that we can quantify that growth. In the year 2016, there were close to 20 million registered mobile money accounts. This was a 50% increase year over year. On all other accounts - active mobile money accounts, total volume of transactions, and total value of transactions - the numbers had double year over year from 2015 to 2016. This is further corroborated by our interview participants, all of whom seem to have participated in these statistics.

In addition, the first author observed a strong mobile money presence in the main parts of each city. In particular,it was common to find multiple mobile money agents within a 50- ft. radius in the main parts of each town.

Further, in the cities of Ho and Kumasi, mobile money had become so ubiquitous that it was becoming an alternative form of currency – both formally and informally. In nascent mobile money markets, where mobile money has yet to gain popularity, the main concern is in getting users to adopt the service. This is because in the beginning, we expect users to use mobile money primarily for sparse transactions and primarily for remittances over large geographical distances. However, seeing mobile money being accepted in places such as hotels to pay for accommodation, points to a much more mature market. Brick-and-mortar stores, street stands, and market vendors alike were accepting mobile money in these cities.

In addition to its direct use for goods, mobile money has created a market for indirect services relating to mobile money. In our interview with a merchant from Togo, we learned of a service that he uses to transfer mobile money from his account to a bank account to pay for his supplies. In the cities of Accra and Ada, we came across stands that sent money from one service (i.e. MTN Mobile Money) to a receiver on a different service (i.e. Vodafone cash). This service has filled the gap of interoperability that Ghana and many other countries have had difficulties with.

In other interviews, it became clear that many of the Mobile Network Operators (MNOs) had responded to the shortcomings in the previous iterations of their mobile money services that we had categorized as barriers during our literature survey. The efforts taken by the MNOs include increasing the agent availability, mass advertisement campaigns and constant offers and promotion by the MNOs. Another explanation could be the network effect where promotions and rapid uptake by peers could have led individuals to sign-up or use the mobile money services.

4.2 Financial Inclusion & Metrics

In the currently available literature, mobile money and its performance is discussed in the context of absolute numbers for users, active accounts, value transacted, and the number of transactions. This, along with the pronounced importance of remittances in services like M-Pesa, had led us to believe that mobile money usage among the low-income populations would be low and sometimes exclusively as receivers of mobile money transfers. In particular, we expected that the urban low-income population would have low usage of mobile money services because of the reduced need to close geographical gaps for sending money. To this end, we were unsure of how to reason about the efficacy of mobile money in expanding financial inclusion.

Figure 3: Tariff Table of Vodafone (left) showing customer charges for transaction bands, charges for airtime, check balance, and pin change and Bill payment etc ; Customer fees of TigoCash (right) with multiple rows and columns for payment brackets, along with columns for types of transactions (Withdraw cash, deposit cash, send cash etc)

In conversations with those who referenced limited income, we found that many use mobile money to send or receive money to family or friends and across distances, but do so rarely. Users are not sending or receiving money often because they are making a limited number of financial transactions to begin with. Yet, this does not mean that they are not transacting. More importantly, this presents the potential that mobile money does promote financial inclusion, bringing in those who would otherwise not have a financial account. This points to an important learning: mobile money needs to be assessed in the context of existing practices if it is to accurately capture those who are being financially included through mobile money.

One participant respondent shared: *"I don't spend a lot of money."* (Cloth Maker, Woadze Tsatoe)

This characterizes an important aspect of mobile money use - the use of mobile money by low-income populations, and against the target of financial inclusion goals, must be in the context of their existing transactional base rather than an absolute value, as has been the prevailing measure thus far. One participant would go on to describe her purchasing schedule as : *"I only buy things at the end of the month."*(Nurse, Apemanim)

This shows that even if she were to use mobile money to carry out these transactions, they would be characterized as low usage in absolute terms. However, her use of mobile money for these services would translate to a large conversion of her spending from physical cash to mobile money services. We aim this finding at the second component of our study: understanding the potential for mobile money to meet the financial needs of Ghanaians, particularly those who have not previously been financially included.

While advertisements of mobile money will appeal to the altruistic heartstrings, touting "goals" of financial inclusion, we find that the current approach does nothing additional to assess whether mobile money succeeds in these goals. The current metrics will sparingly include percentage of active of "rural poor populations" or percentage of users with bank accounts vs. mobile money accounts (overlap undefined). However, this fails to capture what we believe to be an accurate representation of the unbanked population. Arguments may be made of how, as a developing country, the goal may be to include the entirety of the county and to this end, we find that whether the whole, or the part, the metrics as they stand do not accurately depict the goal of financial inclusion.

4.3 Tariffs/Fees

While some mobile operators initially offered free transfers, all of the existing four mobile money operators in Ghana charge tariffs/fees for each transaction by the time of our field work. Our first examination of the tariff tables noted the crowded rows and columns as seen in Figure 3. Each of these rows represents an amount bracket, followed by the costs to send any amount of money within that bracket. While informative, this kind of visualization places a lot of information with high cognitive load on the reader. Based on this, we thought that when users would try to use this instrument to gauge the price of their transfer, they would be confused as to the cost of sending their transaction as well as the final amount to be sent. This difficulty in understanding the costs of sending money could pose to a barrier for uptake.

However, we find that despite the number of rows and columns, the table, in its entirety, is not how the tariff table is ultimately consumed by end users. Instead, users tend to operate consistently within the same band of transfer amounts. Therefore, most users have memorized the resulting charges for their commonly used bracket. In asking about tariffs, the first author found themselves being corrected for stating the incorrect tariffs, further solidifying this one-row memorization model.

When the interviewer stated *"So when you send 50 cedis it can cost 2 cedis or some amount?"*, the participant responded with: *"Over here when you send 50 cedis, you pay 1 cedi. When you send 100 cedis, you pay 1 cedi. When you send 150, 2 cedis."* (Batik Maker, Apemanim)

"The thing is, for every 1 cedi you send, you have to deduct 10% from it. So my friend right now, what he will be buying is 10 cedis, so in order for you to get exactly 10 cedis, i will have to send 11 cedis so that he will have exactly 10 cedis." (Student, Ho)

"There's the charges and I know the charges. 1 to 50 you will pay 50 pesewas, and from 60 to 100 cedis you are charged 1 cedi. You see that's why, I often transfer money and receive money. So I keep on remembering." (Teacher, Apemanim)

4.4 Use Cases of Mobile Money

In the course of our survey, we identified three main use cases among the participants: 1) sending money to friends or family, 2) backup accounts, and 3) business. Of the 25 participants, the majority - 15 - used mobile money as they needed it to send home or to friends, 5 had backup accounts as we discuss above, and 5 used mobile money primarily for their business needs.

While sending money to friends or family across regions is still the most popular use case, it is characterized differently than the predominant use of remittances in other mobile money comparisons such as M-PESA. Among our 15 participants, we find individuals

sending money to other countries, children away at school, children away at relatives, friends who borrowed money, or even selling goods from hometowns to classmates.

Backup accounts are as we discuss above, but potentially a country-specific consequence given the willingness to sign up with the intention to leave the account unused. Finally, we find 5 participants using mobile money for their business either as merchants accepting payments via mobile money, or as mobile money shop owners

4.5 Intermediaries

One thing we notice, particularly prevalent among our older interview participants, is that there are often intermediaries using mobile money services on behalf of individuals. During our survey, we found two different ways this can culminate: 1) an intermediary carrying out a transaction on behalf of an individual using the individual's account or 2) an intermediary carrying out a transaction on behalf of an individual using the intermediary's account.

For example, we observed two of the older female merchant participants handing over their phones to their daughters during the course of the interview to demonstrate actions on their behalf. Similarly, a student from Ho describes how his mother sends him money while he is away at school using mobile money:

"The thing is, we have someone here that works with mobile money and that person is a friend of mine. So I just tell her, since she is not educated like me, I just tell her go to my friend, give him the money and my number and tell him to send it for me. And since he [the mobile money agent] is a friend, he will send it." (Student, Ho)

Alternatively, one of our participants would describe his role as the intermediary transacting on behalf of another individual using his own account in the following:

"If let's say somebody who is illiterate wants somebody to transfer money to him or her, maybe if I am using the mobile money he just come to me and tell me that he is giving my number to somebody to transfer money on it, they send to me. For that one I don't normally give the password, I will just give you my phone number so as soon as the money comes I will tell you that money has come. So I will go and get it." (Teacher, Apemanim)

These two ways in which intermediaries transact on behalf of individuals leads us to two considerations for future research in financial inclusion space namely:

- How large and what demographics make up these two subgroups
- What are the barriers keeping these individuals transacting for themselves and are there ways in which mobile money offerings can reduce the gap from their end

4.6 Education

Most of the participants informed about how during their first visit to the shop, they were given a walk through tutorial on how to use mobile money. Almost all participants agreed that the training lasted 20 to 30 minutes where someone from the shop worked with them to help understand the navigation of menus and their purpose. For the most part, participants did not remember the training. However, that did not affect their usage because everyone found the mobile money apps very easy since they memorize the specific numbers they always use and don't explore the rest of the mobile money application. This points to the need for more active education as compared to one time education as well as need based training.

4.7 Backup Accounts

5 of the survey participants emphasized that while they have a mobile money account, the account was "just in case" or present as a backup account - one created and used only for emergencies or a one-off situation. A couple of participants would go further to say they even preferred not to use it if possible. We found this an interesting dichotomy - the users saw the value of mobile money enough to be proactive in creating an account, some even before an actual emergency occurrence, yet did not want to actively use the account.

We observed and believe that one reason of this lack of use with existing account could also be answered with the fee structures. As already mentioned many of these mobile money services started as free of cost or promotional offer services to gain traction and get more user base. However, later on the same services became paid and could be a reason for the lack of active users.

Besides tariff, we also observed cultural reasons that could explain the non-use. Two respondent's expanded on the cultural pressure underlying their hesitations to actively use their mobile money accounts. They described the expectation held of them: if they happened to have money in their wallets at the time of a request, they could not refuse those requests from family and friends.

Two participants independently corroborated this dilemma: *"If your family knows you have mobile money they want it. If you don't have mobile money in your wallet, it's not excuse to say no to giving money."*(Radio Host, Ada)

"If I have money, I have to give it to friends or family when asked. I signed up JUST IN CASE, but I don't want to use it."(Community Service Director, Ho)

However, not having funds in their wallets excused them from the situation altogether. This revealed a specific privacy expectation. In this sense, mobile money's ease of use and ability to connect large geographical regions would serve as a double-edged sword. The efficiency and efficacy of the service was what kept these two respondents from fully utilizing the service.

4.8 Value-Added Services

During our interviews, we asked a final question of 'If you could make a new feature with Mobile Money, what would you do'. We found the responses to this question particularly interesting and revealing of the mobile money's potential in the country.

4.8.1 School Fees. A student from Ho described how helpful it would be if students could use mobile money to pay for school fees. As it stands:

"We pay school fees we pay at the bank. it would be more easier for me, the student [to pay with mobile money]. So maybe using mobile money to pay our school fees, it would be easier than going to the bank because some place where you go there is no bank, but there is a mobile money agent there. But if you have the money you can't pay, cause you have to go to the bank. You have to take taxi from that place to where the bank is." (Student,Ho)

The current process to pay for school fees, while based on the trust bank security, is time-consuming and disproportionately affects those living in rural areas. However, mobile money offers a potential solution for this issue, especially in a country where a student can oftentimes go to school far away from their home or the home of their guardians. Offering this service would not only assist these rural populations, but would also incentivize those who may not currently have mobile money, to become financially included. A special consideration in this case is understanding how to deal with institutional mobile money accounts and what that would entail. This kind of account may require more oversight based on the institution to ensure safe and legal account.

A phone repairman from Ho drew upon his experiences with taxi drivers to recommend the use of mobile money for fair business transactions. He described that in the city of Ho, and potentially other cities in Ghana, a taxi driver is often separate from the taxi owner. On a daily basis, a taxi driver will go to a car/taxi owner, known through personal connections, and "rent" the car for the day. Based on his earnings for the day, he would pay the car owner a share of his earnings for the day. However, he shared, that sometimes the taxi driver will return the car and tell the car owner that they had made no earnings for the day. Now, this system is built on a culture of trust and gives the benefit of the doubt to a taxi owner who truly could have had a bad day for their business. However, there are unfortunately individuals who abuse this trust in order to retain the extra earnings.

In this case, the repairman suggested the use of mobile money to have some sort of shared account between the two business partners. That would ensure the ability for the car owner and taxi owner to rely on the activity on the account so they can both share in the profits. This suggestion would be difficult considering the longevity of such a business partnership (potentially a day long), the current model allowing only one account to a person, and the organization. Yet, the suggestion may not be very far off in the entrepreneurial environment.

These suggestions were especially motivating against the second portion of our study looking at mobile money's ability to fulfill the financial needs of Ghanaians. While the MNO offerings are simple transfers, deposits and withdrawals, we find that the flexibility of these transactions and the agency of the users opens up possibilities for Ghanaians to fit mobile money into their own needs.

4.9 Current DFS structure and User's Needs

Digital Financial Services and the goal of financial inclusion has been to increase the access to formal financial services to low-income individuals. It has been promoted as this enabler of financial services to economically marginalized. However, we observed that the current users of the mobile money are individuals who already are fluent in English or have bank accounts. Though that has not been a limiting factor in usage in Ghana, we observed and heard that the tarriff structure was not supportive of the low-income groups. The tariff structure was based on disproportional percentages and for individuals who transact in lower brackets the tariff structure was higher. Though from an MNO perspective the 5 pesewas might be a marginal cost, participants with lower incomes still consider it large. And the existing lower tariff incentives are for users who transact more.

Similarly, the idea of mobile money shop agents was to bring ease and comfort closer to the end users. However, as observed in conversations that participants who thought the closest shop is still far away, and very far in rural areas. We observed that it was better than no bank, but for frequent once a week visitors, it was still far. Thus, mobile money designs and how they are offered play a role in their usage and uptake.

4.10 Reflexivity and Resulting Limitations

As mentioned in the Methodology section, the interviews and observations discussed in this research are done primarily by a young woman author who is Korean-American descent and speaks fluent English. The interviewer believes that her interaction, as well as the potential answers, might have been impacted her gender, appearance or dialect. This could also be a reason for larger number of male participants as compared to women participants. Similarly, the interviewer also faced many uncomfortable situations including individuals in these marketplaces requesting for her contact information and even marriage proposals. These have led to sometimes avoiding additional conversations in the same market or in similar spaces. At some points, the interviewer was also accompanied by other woman researchers, where they would ask questions in groups. This might have also impacted the potential responses of the participants.

The participant recruitment was done by visiting various public spaces and markets in Ghana. However, these markets and the days visited could have biased the participant recruitment. The participant also talked to a number of participants in the evening or when getting food at later in the day from a market. It was observed that women were not out during that time and more men were seen on the streets, who the participant could talk to (because of their understanding of English or comfort level). The only women seen in all four of the places of the interview were women who were running food stalls at night.

4.11 Over-researched Groups

In addition to the interview findings, it was also observed that many participants, especially those recruited through existing contacts in Ghana seemed rather relaxed about being interviewed by a foreigner. The participants seemed comfortable with being asked questions and it appeared as if the country's situation and placement by the global community as an 'emerging economy' was at the forefront of Ghanaians. The pattern and comfort of answering depicted a sense of a routine of answering similar questions for some of the participants. This may be because the program managed by the two accompanying professors has been in place and running for multiple years and it is possible that those specific individuals might have been interviewed a lot. We also think that the self-selection bias - the agreement to participation by individuals who are more comfortable to interviews - might have also played a role in such a situation.

Our observation was confirmed when the participants recruited through visiting public spaces were more excited at the idea of

being interviewed. Over-researched groups is not a new idea [10] and its understanding and awareness become more important in developmental settings where such chances are higher. It also brings a point of understanding these biases without explicit information as the participants might not feel comfortable or in authority to either refuse to participate or might feel comfortable but may belong to an over-researched group at the same time [31].

5 CONCLUSION

This paper presents an investigation of the study of mobile money in Ghana and adds to existing literature financial inclusion in various countries.

We employed field visits, semi-structured interviews, and observations to understand the mobile money landscape in Ghana and how it is defined by the financial needs of its population. We saw that the financial needs are mostly defined by money necessary for food and other basic services, often paid for on a routine of monthly or sometimes weekly basis. We put forward the question of whether we are using the right methods to measure the success of mobile money - are we assuming that it does not meet the financial needs of people or is not successful just because people are not using it in large amounts, constantly, every day? We then present that despite its use as a one-off service in some cases, the service still offers utility for the financial needs of individuals, which are markedly different from the financial needs of merchants using the same services. We also noticed that most individuals using these services already have access to bank accounts, so while it may not be offering a new way to meet their needs, it is offering an improvement to the way things are already done.

Our work also touches upon the researcher-reality gaps by sharing the literature-field gaps as well as the difference in consumption of tariff rates.

We highlight the multiple use-cases of mobile money use made up by individuals, individuals with the help of intermediaries (both paid and unpaid means), and by entrepreneurial shops providing third-party mobile money services. We also noticed instances of account creation without actual use which pointed to the potential employment of it as a backup option. We recommend a closer look at such contextual use cases, users' needs and actual financial transactions and capitalizing on these to fully utilize and engage populations in mobile money.

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