Closing the Gender Gap in Mobile Banking in Ghana

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Abstract

Financial inclusion remains low for women in Sub-Saharan Africa, but digital financial services have the potential to deliver affordable financial services to women. This research studies constraints to active mobile banking use by surveying the clients of a financial institution in Ghana.

I found that while low savings capacity and lack of awareness inhibit both men and women from actively using mobile banking, three constraints disproportionately constrain women: low digital literacy, the risk of fraud, and the lack of agency. Women in this population are well-educated, which indicates that education is not a predictive factor for digital literacy, fear of fraud, or agency. Rather, these constraints are systemic and require active intervention by financial institutions and other organizations to close the gender gaps that limit adoption.

This research identifies unique profiles for various user types, including non-registered clients, registered non-users, and infrequent users. I propose cross-cutting interventions to address constraints across these groups and tailored approaches to encourage uptake within each user group, including robust, contextualized, and accessible training programs with in-person components tailored to each user group.

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Glossary of Acronyms

DFS	Digital Financial Service(s)
GSMA	Groupe Speciale Mobile Association
NGO	Non-Governmental Organization
SASL	Sinapi Aba Savings and Loan
SM	Sinapi Mobile
SSA	Sub-Saharan Africa

Chapter I

Introduction

Payments and banking in Sub-Saharan Africa (SSA) have evolved rapidly over the last 15 years. Mobile money and mobile banking have scaled quickly in SSA, allowing people to utilize simple feature phones to make peer-to-peer money transfers, bill payments, payments for school fees, and even take out loans (Lashitew, et al., 2019). Yet, women use digital devices and services at lower rates than men, foregoing benefits offered by financial inclusion and limiting the growth of developing economies (World Bank Group, 2019). In SSA, 74 million women remain digitally unconnected, there is a gender gap of 37% in use of mobile internet, and a 33% gap in ownership of mobile money accounts (GSMA, 2021). Gaps in mobile ownership and digital connectivity exacerbate inequalities in economic opportunities and cause barriers for women seeking access to essential services, information, and control over finances.

The aim of this research is to identify constraints and develop strategies to narrow the gender gap in mobile banking, to identify constraints that affect men and women, and constraints that specifically affect women. I partnered with a financial institution in Ghana, Sinapi Aba Savings and Loans (SASL), which is eager to close its gender gap in mobile banking in order to achieve its broader aim of improving financial and gender inclusion.

This research found a generally strong appetite for mobile banking, along with clear constraints that inhibited active use among men and women, and specific

constraints that affect women. I found three constraints that affect both men and women: (1) those who are not registered for mobile banking are generally unaware of the service; (2) women and men struggle with understanding how to use mobile banking and digital financial services (DFS), and the majority of respondents request help to improve their understanding; and (3) those who do not have sufficient savings capacity are not likely to be active users of mobile banking.

I also found three constraints that disproportionately affect women: (1) a gender gap in digital literacy, (2) women lack confidence to set up and use digital security, and (3) women have less independent decision-making power. Women who are not active users of social media have low digital literacy skills whether or not they are well-educated. This has important implications, as we cannot assume that educated groups of women have adequate digital literacy to use digital financial services. Among well-educated clients, women are 26% less likely than men to perform mobile money transactions without help from others. This finding indicates that digital literacy gaps are systemic, and that both well-educated and less-educated women need a robust and tailored education to close the digital literacy gap.

Confidence in the security of digital transactions is a barrier to entry for women, as non-registered female clients are 21% less likely to trust digital channels than male clients. Finally, I identified a clear gender gap in independent decision-making power. For example, women are 59% less likely to decide on their own to open a bank account than men.

This research highlights several factors that inhibit women from actively using mobile banking. Some constraints affect both men and women, presenting ways to close

the gender gap through attention to women's needs and opportunities. Other barriers that overly affect women are vital to address in order to close the gender gap, and many of these factors will remain systemic unless there is active intervention.

These factors can be addressed by financial institutions and non-governmental organizations (NGOs). Financial institutions aiming to close the gender gap in mobile banking must address constraints that disproportionately effect women, including fear of fraud and low levels of digital literacy. Financial institutions can equip women to deal with fraud and increase their digital literacy through a robust education program designed specifically for women in their context. Training should include contextualized content paired with in-person assistance to increase effectiveness of knowledge retention and business performance.

This research identifies unique profiles for various types of users who are not yet active users, including non-registered clients, registered clients who have not completed their first transaction (non-users), and infrequent users; each user group requires a tailored approach to encourage uptake. To address the unregistered user segment, women can be engaged in outreach campaigns to increase registration among women and to improve digital literacy through robust education programs. Women in the non-user group need help completing the first transactions and require more empathy and training. These women would benefit from gender champions at the branch level to assist non-users with their first transaction and provide hands-on training. Women in the infrequent user group may benefit from multiple touch points, including voice messages and in-person information sessions, to address their specific challenges and understanding gaps.

NGOs can also play a role in improving women's financial access to mobile banking. This includes equipping them to deal with fraud and improving their independent decision-making ability. Robust, contextualized, and accessible training programs conducted by NGOs can improve financial decision-making autonomy and improve financial literacy.

Research Questions and Hypothesis

Several factors contribute to the gender gap in mobile banking: information and knowledge gaps, interhousehold dynamics, societal and gender norms, digital financial literacy, and perceptions of safety and security. Some of these constraints may affect both men and women, while others disproportionately affect women. Understanding these agnostic constraints is important for increasing and improving digital financial services in general, and also may be useful in devising gender-specific strategies for closing the gender gap in mobile banking. However, it is essential to understand gender-specific constraints in order to address systemic barriers to access.

To utilize a service like mobile banking, women and men must have access to specific tools, be aware that such a service is available, have a need to access the service, and have the ability and confidence to use the service. These enablers of mobile banking can be thought of as steps along a digital journey.

In this research, I looked at clients of a financial institution in Ghana, a setting where there is low financial inclusion, in order to identify gender constraints. I analyzed male and female clients along a spectrum of mobile banking activity to identify constraints to active use in general as well as gender-specific constraints.

Key Constraints for Women and Men

Earlier steps along the digital journey may be constrained by access: lack of awareness, lack of tools like mobile phones, and lack of literacy and numeracy skills may all constrain access to mobile banking. My first research question asks: What are the key constraints for women and men that inhibit mobile banking usage? I hypothesize that men and women share many key constraints that affect their digital journey (Hypothesis 1), and that earlier steps on the digital journey are not the primary determinants of the gender gap in mobile banking—earlier steps being lack of awareness, lack of access to mobile banking, and need to use mobile banking (Hypothesis 2).

Key Constraints Disproportionately Affecting Women

Later steps along the digital journey are more heavily influenced by social dynamics, including digital literacy and ability to make independent decisions (agency). My second research question asks: What constraints disproportionately affect women? Based on gender gaps in digital literacy in SSA, I hypothesize that lower levels of digital literacy make a woman less likely to utilize mobile banking (Hypothesis 3). Informed by recent literature on agency in financial decisions in SSA, I hypothesize that increased decision-making autonomy is correlated with higher uptake of mobile banking (Hypothesis 4).

This research makes important contributions to understanding how women interact with and understand digital services, with implications for improving women's access to digital and financial services. Since mobile banking is a relatively new service, this research contributes to knowledge about how structural constraints inhibit women's

uptake of innovative services. New technology may exacerbate gender divides if underlying constraints are not accounted for and addressed. However, if we understand and address these underlying constraints, innovations in financial services may facilitate financial inclusion for women. This research has policy implications for institutions and development actors seeking to improve financial inclusion and economic growth in developing countries.

Chapter II

Literature Review

A large portion of the worlds' extreme poor lives in SSA, making financial inclusion[1] and digital integration[2] a high priority for many countries in SSA as a potential accelerator of poverty reduction. Access to financial services allows businesses to cope with economic shocks and cyclical revenue, grow businesses, and contribute to economic growth. Mobile money has been shown to enable a more efficient allocation of labor, lift households out of poverty and reduce extreme poverty among households headed by women (Suri & Jack, 2016).

However, clear gender gaps remain in digital and financial inclusion. A growing body of literature shows that mobile phone innovation can play a role in improving inclusive economic development in Africa (Asongu, et al., 2020). But new technology also holds the potential to exacerbate systemic challenges and widen gender gaps if underlying constraints are not addressed. We are at the very beginning of understanding how mobile technology interacts within household and community dynamics but the following research lays the groundwork that informs my research questions.

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[1] *Financial inclusion* is the ability to access to quality, affordable, and convenient financial services. In a state of financial inclusivity financial services are available, accessible, efficient, sustainable, and low-cost, and widely used by clients (Ahmad, et al., 2020). *Financial services* generally refer to transactions, payments, savings, credit, and insurance.

[2] *Digital inclusion* allows people and small business owners to access education, information, financial services, and other opportunities through digital tools like mobile phones. Digital and financial divides are important drivers of inequality, and access to digital tools and financial services may help bridge that divide.

Financial Services in Africa

Faced with high costs of formal financial products,[3] women and men in SSA typically access finance through cooperatives, NGOs, savings groups, and other informal arrangements[4] since these nonbank financial intermediaries offer more affordable and tailored services than formal financial institutions (Honohan, 2007). However, these informal arrangements carry distinct disadvantages: borrowing and saving ceilings that limit the ability to grow businesses and savings, and insecure cash storage methods that increase the possibility of theft. Access to financial products is important because they enable people to finance income-generating projects, finance education initiatives, and contribute to financial stability (Zins & Weill, 2016). DFS provide a potential pathway to affordable, formal financial services, which provide more secure and affordable channels for people to transact and build wealth.

Digital Financial Services in Africa

Payments in SSA have evolved rapidly in the last 15 years, opening opportunities for cheaper and more secure ways to transfer money and greater access to capital, but barriers to access have limited DFS growth. Mobile phone networks have allowed SSA to

[3] When compared with the rest of the world, Africa's banks have operating costs, wide interest rate spreads, factors that contribute to increased cost to the borrower (Honohan, 2007). Information asymmetries and lack of collateral make screening potential borrowers difficult, risk prone, and costly (Kimuyu, 1999). Formal financial institution business models do not support mass transactions of small loans or deposits, as the cost of these transactions are independent of the size of transaction (Alhassan et al., 2019). High transaction costs, difficulty of access, long turnaround time, and stringent paperwork requirements contribute to the low uptake of formal financial services for many Africans (Aryeetey, 1991).

[4] Households also borrow from each other to meet household needs and may participate in community savings and loan groups such as rotating savings and credit associations (ROSCAs) or village savings and loan associations (VSLAs) (Kimuyu, 1999). Informal financial agents also provide a source of credit (Christensen, 1993). However, they face constraints to meeting credit needs at scale due to increased risk of default due to variable income streams, increased transaction costs, and lack of appropriate collateral (Christensen, 1993).

leapfrog fixed line telephone infrastructure to allow people to connect via wireless devices. This has paved the way for mobile money, which has risen rapidly in SSA (GSMA, 2020). World Bank's Global Findex, a financial inclusion survey, shows that mobile money accounts have doubled between 2011 and 2017 in SSA (Demirgüç-Kunt et al., 2018). People in SSA utilize mobile money services to make peer-to-peer money transfers, bill payments, and payments for utilities, school fees and airtime credit; in some cases, mobile money services include microcredit (Lashitew, et al., 2019).

Several constraints are documented in the literature which limit adoption of DFS. According to research by GSMA,[5] the most important barrier for access to internet in SSA is lack of digital skills, and the second most important barrier is lack of awareness and locally relevant content. Cost came in as the third most important barrier (GSMA, 2016). Low network coverage in Africa is an important concern for mobile money adoption.[6] However, 457 million people in Africa are covered by 3G networks yet do not connect to the internet via mobile devices. While in some areas lack of phones is a barrier, mobile phone penetration in Ghana is relatively high, as 80% of adults reported owning a phone in 2018 (Pew Research Center, 2018). Smartphone ownership is also rapidly increasing, as 35% of adults own a smartphone—more than double the rate reported five years prior to the survey (Pew Research Center, 2018). Enabling regulatory

[5] Groupe Speciale Mobile Association (GSMA) is an association representing the interests of mobile operators and the broader mobile industry worldwide.

[6] Infrastructure and policy play an important role in creating an enabling environment for DFS. According to a report by GSMA in 2016, "Africa is the least developed region in the world for mobile connectivity and adoption." Mobile penetration is 43% in SSA and mobile internet penetration 23%.

environments are correlated with high mobile money adoption rates[7] (GSMA, 2020). While regulatory environments are clearly important for uptake of mobile money and mobile banking, countries with accommodating regulatory environments still have low uptake of DFS among significant portions of their populations (Evans & Pirchio, 2014). More research is needed to identify specific barriers for DFS and digital payment adoption in specific contexts.

Mobile money has been shown to be beneficial on a range of issues, improving financial inclusion, reducing impact of shocks, increasing consumption, and reducing extreme poverty (Jack & Suri, 2014; Lee, et al., 2021; Suri & Jack, 2016). Mobile banking builds on this success to allow clients with bank accounts to transfer money between bank accounts and mobile money accounts, withdraw or deposit cash by visiting a mobile agent, and access other financial services through a mobile phone. In SSA, mobile banking generally requires only a feature phone, which lowers the bar for access among those who do not have access to a smartphone. Mobile banking may reduce transportation costs by replacing branch visits, and reduces the need to carry cash over long distances. Digital financial services, including mobile banking, show promise in improving affordable access to formal finance, combining the benefits of low cost with the benefits of formal finance (Zins & Weill, 2016).

[7] Certain policies related to taxation and data requirements are particularly difficult hurdles to overcome and can threaten mobile money adoption (GSMA, 2020). In one global review of mobile money, heavy regulation and government-mandated restriction to bank-led models of mobile money reduce mobile money viability and scalability (Evans & Pirchio, 2014).

Gender Gaps in Digital Connectivity

Women utilize digital devices and services at lower rates than men and represent tremendous potential for developing economies (World Bank Group, 2019). In developing economies, men are more likely to have an account to store money than women: 67% of men compared to 59% of women (Demirgüç-Kunt, et al., 2018). Also, more men use digital finance than women. For example, in low- and middle- income economies, 40% of men sent digital payments in 2017 compared to 32% of women (Demirgüç-Kunt, et al., 2018). In SSA, 74 million women remain digitally unconnected, and there is a gender gap in mobile ownership of 13%, in mobile internet of 37%, and mobile money account ownership of 33% (GSMA, 2021). In Ghana, there is a gender gap of 16% in mobile phone ownership, 17% in mobile money use, and 56% in internet use (GSMA, 2017). There are 2.5 million fewer women online than men in Ghana (GSMA, 2017).

Gaps in mobile ownership are significant because they exacerbate inequalities in economic opportunities.[8] Several dynamics contribute to the gender gap in mobile ownership and digital connectivity. Information and knowledge gaps, interhousehold dynamics, resource allocation within households, societal and gender norms, and social networks could all factor into how men and women utilize mobile money accounts for productive purposes.

[8] These barriers became increasingly important in the wake of the Covid-19 pandemic, as access to critical information, services, and opportunities were even more essential. Digital connectivity enables women and men to access health information, healthcare services, accurate information, and allows them to purchase essential goods and continue earning an income when economies and travel were restricted. By the end of 2020, 47 million women were estimated to be pushed into poverty as a result of Covid-19 (UN Women, 2020).

Gender and Financial Management

Household financial management is shaped by social norms and has direct implications for financial and digital inclusion, and these dynamics can determine whether technology increases equity or exacerbates existing barriers. In cultures like Ghana, where men are typically the household breadwinners and provide substantial household needs, research has demonstrated that a woman downplays her role in contributing to household finances, even intentionally limiting business growth, to show respect and support for her husband (Friedson-Ridenour & Pierotti, 2019). This demonstrates the power of social norms to dictate decision-making power.

Research has shown that in Africa, businesses run by women have lower profits than men, and fewer employees (World Bank Group, 2019). One explanation for this, supported by experimental evidence, is that women-owned business funds are diverted from the business to support household expenses or the husband's business (Bernhardt, et al., 2019). When women are not subject to this family sharing pressure, they are able to expand their businesses (Bernhardt, et al., 2019).

Recent evidence demonstrates that if loans are disbursed through digital channels to women entrepreneurs in ways that dedicate the funding to their business, they invest more of the loan into their business, and experience higher returns on business investment, which benefits the household overall (Riley, 2020). This indicates that digital channels may contribute to increased decision-making autonomy. However, this lack of autonomy could limit women's ability to access phones and bank accounts in the first place. These inter-household dynamics have received some attention in the recent literature, although other barriers to DFS adoption are less explored.

There are several plausible reasons for the gender gap in DFS in SSA that have received little attention in the existing literature. Women may be deterred from utilizing digital services due to security risks. Other issues of confidence or risk aversion may deter women from using mobile money. There may be a gap in digital literacy, which precludes women from engaging in mobile transactions or that leads to lack of confidence in using mobile banking services. This is an important constraint because both financial and digital literacy have been shown to serve as critical pathways to building financial resilience and inclusive financial access (Lyons, et al., 2021). These issues are under-studied, although they are important for understanding barriers and enablers of digital and financial inclusion in SSA.

I propose that increased decision-making autonomy is correlated with higher uptake of mobile banking, also that lower levels of digital literacy make a woman less likely to utilize mobile banking. Information about mobile money and banking may lead to greater use of financial services, including savings and access to credit.

Key Terms

Financial inclusion: Owning an account that allows saving, borrowing, or use of payment services, for example over mobile networks. Determinants include access to financial institutions or mobile agents, usage of financial services like number of transactions, and appropriateness of financial products and services to match clients' needs.

Financial institution: Banking institutions regulated by the central bank that provide financial services.

Know Your Customer (KYC): Regulations imposed by governments to reduce risk of fraudulent activity, generally requiring proof of address and identification. Some

countries adopt tiered KYC, often proportionate to risk, to increase access to formal financial services.

Mobile banking: Financial transactions conducted on a mobile device through a financial institution, including the transfer money to/from bank accounts from/to mobile money accounts, checking balances, paying bills, and purchasing phone airtime. Users can withdraw cash from their mobile accounts by visiting a mobile banking agent. In the context of this thesis, these operations are completed by selecting options from a menu using a keypad and do not require a smartphone. In SSA, mobile banking often requires a user to sign up by visiting a bank branch, and holding a mobile money account is often a prerequisite to opening a mobile banking account.

Mobile money: Electronic money stored and sent through mobile devices over a network provided by a mobile network operator. A user typically registers for a mobile money account and deposits money with a local mobile money agent, and then sends or receives electronic money held in a mobile wallet. Users make transactions from a mobile device or withdraw money from a mobile money agent.

SSA: African countries south of the Sahara region that share similar development constraints, including infrastructure challenges, central bank oversight, and macroeconomic environments. However, they vary considerably in economic development, mobile money adoption, and regulatory control.

Chapter III

Research Framework and Methods

In this research, I looked at clients of a financial institution in Ghana, a setting where there is low financial inclusion but rapid uptake in mobile banking, in order to identify gender constraints. I analyzed male and female clients at a financial institution where there is a gender gap in mobile banking. Using stratified random sampling, I made comparisons across mobile banking activity levels ranging from active use to non-registered users. I used regression models to identify general constraints to active use as well as gender-specific constraints. The individuals in the sample are generally well-educated and digitally connected, yet a gender gap in mobile banking persists.

Case Selection

SSA leads the way in mobile money adoptions (GSMA, 2020). East Africa has far more registered accounts and active users than other regions within SSA and receives the most attention for its integration of mobile money and mobile banking. However, other regions in SSA, such as West Africa, are growing more quickly (GSMA, 2020). Enabling regulatory environments are a prerequisite for mobile money adoption rates (GSMA, 2020). This research was conducted in a context of low financial inclusion but relatively open regulatory environment that allows rapid growth of digital financial services.

Country Setting

Ghana is the country of focus for this study. I chose it because of its relatively open regulatory environment, rapid growth in uptake of mobile money and mobile banking, and clear gender gaps in uptake of digital financial services.

Ghana's DFS Regulatory Environment

Ghana has taken progressive steps to make mobile money widely more accessible. The Bank of Ghana has liberalized regulations, kept its KYC (Know Your Customer) requirements low, and moved away from a bank-led model to a more open system. In 2008, branchless banking regulations were established that required regulated financial institutions to partner with telecommunication companies (telcos) and other technology service providers to offer mobile money services. These regulations also established a many-to-many model, which encouraged interoperability between financial institutions and mobile money providers, thus preventing any financial institution or telco from exclusively offering mobile money providers to clients. The regulations also established relatively light KYC requirements, which have generally remained accommodating during future regulatory changes (Kodom, 2019).

Subsequently, prominent telcos operating in SSA (e.g., MTN, Airtel, Tigo) launched mobile money operations in Ghana in 2009–2010 (CGAP, 2011). In 2015, regulations were released that promoted availability and acceptance of mobile money and opened up new opportunities for mobile money operators (Kodom, 2019). This adaptive regulatory environment has allowed digital financial services to grow rapidly in Ghana (GSMA, 2017).

Ghana Financial Inclusion and DFS Gender Gaps

As of 2017, 43% of the population in Ghana used mobile money, and 42% of adults had an account with a financial institution, making this a setting with low financial inclusion (Demirgüç-Kunt, et al., 2018). Due to lack of channels to access formal banking through branches and ATMs, cell phones are a primary way Ghanaians access formal banking and payment services (Glavee-Geo, et al., 2020). However, this access is not evenly distributed, as there is a gender gap in Ghana of 17% in mobile money use and 56% in internet use (GSMA, 2017). There are 2.5 million fewer women online than men in Ghana (GSMA, 2017).

Participant selection

Sinapi Aba Savings and Loans (SASL), a financial institution in Ghana, was chosen as a partner in this study because SASL is eager to narrow its gender gap in mobile banking, while also emphasizing financial and gender inclusion. Participants for this study were chosen from SASL's large customer base.

The institution was founded in 1994 and now has 45 branches across Ghana, with a client base of more than 450,000. SASL actively champions financial inclusion and financial empowerment in Ghana, and serves low-income entrepreneurs and individuals by providing them with access to holistic financial services. In 2020, the company was awarded the "Gold Award for the Best Bank for Women Entrepreneurs" by the International Finance Corporation.

SASL launched its mobile banking platform, Sinapi Mobile (SM), in early 2019. Since its inception, there has been a significant gender gap in SM user registration and usage. SASL's client base is composed of 74% women, so I expected at least 74% of SM

users would be women. However, only 51% of registrants and 40% of active users were women as of December 2020. This means there are gender gaps of 23% and 34% in registrations and usage, respectively. SASL is therefore a relatively representative case study for evaluating gender gaps in mobile banking in SSA.

Registered SM users make up 8% of SASL's client base, so SASL is eager to grow and correct this gender gap. Of registered SM clients, 28% are active users, 29% are infrequent users, and 43% are registered non-users.

Research Methods

A sample of 250 SASL clients were selected for interviews, comprising 150 females (60%) and 100 males. Stratified random sampling was employed to include sizable numbers of mobile banking customers. The sample frame for this survey includes all clients categorized into four segments, with an equal number of clients in each segment.

1. *Active*: Clients that have registered for Sinapi Mobile and have made transactions or been active in the past 90 days.
2. *Infrequent*: Clients that have registered for Sinapi Mobile and have not made transactions or been active in the past 90 days although they have made transactions in the past.
3. *Non-user*: Clients that have registered for Sinapi Mobile but have never made a transaction or used the service before.
4. *Non-registered*: Sinapi clients that have not registered or subscribed to Sinapi Mobile.

A subset of 12 respondents (8 women, 4 men) was selected from which to collect individual case stories and gain an in-depth understanding of individual clients' digital experiences. The case studies were selected to cover all four segments of clients. Selection of potential clients for the 12 case studies was done through screening during the initial quantitative interview process and in consultation with SASL branch and relationship officers. Table 1 summarizes sample sizes and gender distributions of each segment for both surveys.

Table 1: Sample Stratification by Mobile Banking User Type.

Segment	Active	Infrequent	Non-Users	Non-Registered	Total
Men	25	25	25	25	100
Women	38	38	37	37	150
Total	63	63	62	62	250

In-Depth Interviews

Segment	Active	Infrequent	Non-Users	Non-Registered	Total
Men	1	1	1	1	4
Women	3	3	1	1	8
Total	4	4	2	2	12

Source: thesis author

These population units were sampled using stratification. So in my survey analysis, I used survey weights to produce estimates related to the population of SASL clients.

Mode of Data Collection

Taking into consideration the ongoing (at the time) Covid-19 pandemic, I designed this study to be conducted with limited face-to-face contact. Data was collected through phone interviews, and via a limited number of face-to-face interviews needed for more in-depth qualitative study. The in-person portion was designed to have minimal interactions: only 12 in-person interviews were scheduled and conducted by just two interviewers while observing all relevant Covid-19 prevention protocols.

A research firm conducted the phone and in-person interviews and collected data. Participants were asked to answer survey questions over the phone in a conversation that lasted approximately 20 minutes. A subset of 12 were identified for a longer in-person, follow-up interview which lasted approximately one hour. The phone interview participants answered the phone, listened to an introduction to the study, gave their consent, and answered questions posed by the enumerator. Phone interviews consisted primarily of close-ended questions with unprompted answer options. Participants were requested to participate in one survey for this study, although 12 participants were asked for a follow-up, in-person interview.

The research team collected data using paper interview forms and then recorded data digitally into SurveyMonkey. Before the data was entered into SurveyMonkey, it was reviewed for completeness, consistency, and adequacy of information provided. The data was then exported for my statistical analysis.

Empirical Strategy

To analyze gender impact on outcomes, I estimated:

$$Y_i = \alpha + \beta F + \gamma E + \varepsilon_i \quad (1)$$

where:

Y_i is the outcome of interest for client i;

F is a dummy for whether the participant is female, so the marginal effect on the outcome of being a woman is estimated by β

E is a control variable that accounts for education in this model and in the following models.

To analyze the differences between stratification groups, I estimated the following regression:

$$Y_{ij} = \alpha + \beta F + \gamma 1(\text{J = UnregisteredF}) + \gamma 2(\text{J = UnregisteredM}) + \theta E + \varepsilon_i \quad (2)$$

where:

Y_i is the outcome of interest for client i in group j

J represents one of 8 stratification groups, including active SM users, infrequent users, registered non-users and unregistered clients, each divided into male and female subsets. I estimated gender differences between groups, like unregistered male users (UnregisteredM) and unregistered female users (UnregisteredF), and between unregistered females to registered and unregistered males.

In some cases, I was interested in the differences between groups regardless of gender, for example, to understand differences between active and other user groups. In these cases, I estimated:

$$Y_{ig} = \alpha + \beta F + \gamma 1(\text{G = Infrequent}) + \gamma 2(\text{G = NonUser}) + \gamma 3(\text{G = Unregistered}) + \theta E + \varepsilon_i \quad (3)$$

where:

G represents stratification groups including both male and female clients, including active SM users, infrequent users, registered non-users and unregistered clients.

I analyzed differences between groups compared to active users and estimated differences by user type.

Descriptive Data

Survey participants were clients of SASL, and 90% of respondents had savings set aside in formal financial accounts. Nearly all (98%) clients are engaged in an economic activity (were either employed or ran their own business), and 69% of women reported their own business as the major source of income. Most (64%) clients had completed secondary education, although 13% never attended school, and 23% had completed tertiary education; these education rates were similar between women and men. These clients were therefore generally well-educated and highly engaged in business activities, not a population in which I would expect to see large gender gaps. Given that these traits are often associated with increased autonomy and digital connectivity, any gender gaps I observed would likely be more pronounced in less-educated and less economically engaged populations.

Location and age were considered when selecting clients for the survey to assure a representative sample of SASL's client base was considered. Clients live in urban (30%), peri-urban (55%), and rural (15%) areas; female respondents lived in urban

(32%), peri-urban (52%), and rural (16%) areas. Clients' ages were under 36 (49%), and 36 and above (51%), for both male and female clients.

Access to digital tools was high among our respondents. A large majority owned their own mobile phones (95%) or had access to mobile phones (99%). All live in an area with mobile network coverage, and 50% of respondents described this network as strong, 22% moderate, and 27% weak. While in some settings access is a key issue, in this context both men and women have high rates of phone ownership and access to adequate network coverage. Even in this case of high access, I still saw gender differences, as the data below indicates, so deeper issues were at play.

All respondents were aware of mobile money: 97% held and used mobile money accounts (all men, 95% of women), and 80% have been using mobile money for more than three years. However, 28% of respondents lacked the literacy and digital skills to perform mobile money transactions on their own. This high level of mobile money penetration will likely be surprising to seasoned development actors and indicates the importance of digital transactions in Ghana. Also, note that there is no awareness gap in mobile money, and a very small usage gap. Mobile banking requires users to learn skills beyond mobile money transactions, so low digital literacy is an inhibitor to mobile banking.

Also, factors that limit financial inclusion among women will also impact mobile banking adoption more than mobile money adoption. Mobile money is an informal financial product operated by telephone companies rather than financial institutions, indicating deeper issues are at play than access to digital tools and services.

Almost all registered clients (96%) receive training on SM. They receive this through a combination of SASL staff (80%), voice messages (35%) and at SASL training events (11%). Only 4% have not been trained, all clients who do not use SM. Keep in mind that due to stratification, I surveyed roughly equal numbers of registered clients who are non-users (they registered but never used SM), infrequent users, and active users. Registered users took the time and effort to register, so I assumed they had a reason to use the service. Since nearly all registered users received training but most of these users are not actively using SM, this data provides a clue that the current trainings are not effective in equipping women to use SM nor are their security fears being adequately addressed.

Chapter IV

Findings: Data and Discussion

Women and men are at various stages of their digital journey, and I was interested in the constraints that hold women back from progressing along their digital journey to participate in mobile banking. Women access necessary tools, become aware of mobile banking, have means and a need to access mobile banking, and must have the ability and confidence to utilize the service.

I found evidence in the survey data to support my first hypothesis, that men and women share many key constraints that affect their digital journey (Hypothesis 1). In the following sections I describe agnostic constraints that are important but do not disproportionately affect women. The data only tentatively supports my second hypothesis, that earlier steps on the digital journey are not the primary constraints contributing to the gender gap in mobile banking among bank clients (Hypothesis 2). There is no significant gender difference in awareness or understanding of SM, although there is a gender gap in savings capacity, related to need to use mobile banking.

Later stages of the digital journey, which are more heavily influenced by social dynamics, may disproportionately affect women. These stages include digital literacy and agency, or the ability to make independent decisions. I found evidence to support my third hypothesis that lower levels of digital literacy make a woman less likely to utilize mobile banking (Hypothesis 3), and I discovered that even educated women also have low digital literacy. I also found evidence to support my last hypothesis, that increased

decision-making autonomy is correlated with higher uptake of mobile banking (Hypothesis 4), and that women make independent decisions at lower rates than men. There is high demand for SM among unregistered users, but only 8% of SASL clients are registered SM users, so there is significant room for improvement.

Data: Key Constraints Affecting Men and Women

In this section, I explore my first research question, which asks: what are the key constraints for women and men that inhibit mobile banking usage? I investigated my first hypothesis, that men and women share many key constraints that affect their digital journey (Hypothesis 1); also my second hypothesis, that earlier steps on the digital journey (i.e., lack of awareness, lack of access to mobile banking, and the need to use mobile banking) are not the primary determinants of the gender gap in mobile banking among bank clients (Hypothesis 2).

The data revealed that lack of awareness, lack of savings capacity, and lack of understanding of mobile banking are constraints that inhibit both women and men from actively using SM. Lack of awareness and lack of understanding of SM are important factors to both men and women, but do not inhibit women significantly more than men. Lack of savings capacity affects both women and men; however, this is a constraint that affects women more than men.

Awareness

All registered clients are aware of SM, but most unregistered clients (58%) are not aware of it, and I found a slight but insignificant gender gap in awareness in this subset. All clients who registered for SM are aware of SM, including those who have never used

the service, so there is no gender gap in awareness among registered clients (even among those who have signed up but never used the service). However, many (58%) unregistered clients reported being unaware of SM. Unregistered females were 9% less likely than unregistered men to be aware of SM, although I am not confident that this is true in the general population of unregistered clients (Table 2., $P = .479$).

Table 2. Awareness in SM among Unregistered Clients

	(1) Aware
Female	-0.089
	(0.124)
AtleastJrHigh	0.323**
	(0.134)
Constant	1.420***
	(0.135)
Observations	62

Notes:
Standard errors in parentheses.
Modeled using survey weights.
Strata groups are Unregistered male and female clients.
* p < 0.10, ** p < 0.05, *** p < 0.01

Source: thesis author.

Lack of Understanding of SM

Lack of understanding is a clear barrier to active SM use by men and women, whether or not they are aware of the service. In the survey, I asked what would make clients consider using SM. Training on use is the top request of clients who signed up but never used the service (60%), and clients who are not registered for SM (69%). Nearly a quarter (22%) of all respondents said they lacked the digital knowledge and skills to use SM on their own.

Women are somewhat more likely (8%) to say they struggle with the complexity of operation than men, although this was not significant at the 95% confidence level (Table 3. Column 2, $P = .155$). This question was posed to infrequent users and active users. Infrequent users were 17% more likely to say this is a challenge (Table 3. Column 1, $P = .005$) than active users. Only 6% of active users said they struggled with complexity. Among the infrequent user group, there was a slight gender gap, with women being 4% more likely to struggle with complexity than men; however, this was not statistically significant (Table 3. Column 3, $P = .654$) so I cannot be confident that this gap would be seen in the population of infrequent SM users.

Table 3. Clients Saying SM is Too Complicated: Infrequent vs. Active SM Users.

	(1) SM Too Complicated	(2) SM Too Complicated	(3) SM Too Complicated
Female		0.078	0.042
		(0.052)	(0.092)
Infrequent	0.170***		
	(0.061)		
AtleastJrHigh	-0.620***	-0.677***	-0.695***
	(0.104)	(0.101)	(0.106)
Constant	0.615***	0.714***	0.820***
	(0.111)	(0.107)	(0.105)
Observations	126	126	63

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
Strata groups in columns (1) and (2) are Infrequent and Active clients, as this question was posed to Infrequent and Active clients only. Column (3) incorporates Infrequent clients only.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author.

Savings Capacity

People who have more savings capacity are more likely to be active users of SM. Among registered non-user respondents, 26% cited lack of money as a reason why they do not make transactions with SM. In my model, active users were 67% more likely to have met their savings goals in the last year than other strata groups (Table 4. Column 1, $P < .001$). Compare this to infrequent users, who were 50% less likely to have met their savings goals than active users (Table 4. Column 1, $P < .001$). Not-registered users were 42% less likely (Table 4. Column 1, $P < .001$). Savings capacity was clearly correlated to active use of SM, indicating lack of savings capacity is a barrier to active use.

Women were 20% less likely than men to have achieved their savings goals over the last year, although this difference falls just outside the 95% confidence level (Table 4. Column 2, $P = .063$). Unregistered women are 27% less likely than men to have reached their savings goals (Table 4. Column 3, $P = .002$), and there is a significant difference between unregistered women and unregistered men ($F(1, 245) = 5.05$, $P = .026$). Among female non-users, lack of money was the most-cited reason why they did not make digital transactions; 32% of women said they did not transact due to lack of money.

Table 4. Users Who Achieved Savings Goals Over Last 12 Months.

	(1)	(2)	(3)
	Met Savings Goals	Met Savings Goals	Met Savings Goals
NotReg	-0.416***		
	(0.090)		
Infrequent	-0.496***		
	(0.086)		
NeverUsed	-0.236**		
	(0.093)		
NotRegF			-0.274***
			(0.085)
NotRegM			0.050
			(0.114)
Female		-0.199*	0.100
		(0.108)	(0.072)
AtleastJrHigh	0.026	0.033	0.026
	(0.116)	(0.113)	(0.114)
Constant	0.669***	0.410***	0.373***
	(0.124)	(0.116)	(0.096)
Observations	250	250	250

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author

Other Constraints Considered

I consider other potential constraints that could affect both men and women, but I found that many of these factors were not primary obstacles to active use of SM. This section remains important because many of these factors were frequently cited as reasons for low digital financial services adoption. Factors in this category include lack of consistent network connectivity, phone ownership, and high fees.

Lack of consistent network connectivity seemed frustrating to users, but it did not seem to be a primary impediment. Among registered SM users, 49% cited poor network connectivity as a challenge they face when using SM. However, only 2% of non-registered users cited poor network connectivity as a reason for not signing up for SM. In-depth interviews revealed that most users had ways to overcome these challenges, such as having accounts with more than one network provider.

Not owning a mobile phone was a reported impediment for 5% of unregistered clients, which indicates this is a challenge but not the primary obstacle to signing up for SM. Nearly all (99%) registered SM users own their own phone, compared to 84% of unregistered clients. However, many of those without phones used someone else's phone, and only 1% of respondents said they did not have access to a phone. Given the relatively high rates of phone ownership in Ghana, and the survey responses that indicated phone ownership was not a primary impediment, I have not listed this as a significant barrier.

Not holding a mobile money account, which is a prerequisite for signing up for SM, is a reason why 16% of clients say they did not sign up for SM. However, this also does not seem to be a sufficiently high threshold to be a primary obstacle. Mobile money ownership was relatively high—97% of respondents said they are registered for and use

mobile money. For those who do not hold mobile money accounts, this remains an important obstacle for using mobile banking, but an obstacle that is fading with the increasing uptake of mobile money.

Affordability is also a concern for users but did not seem to be a primary impediment for active use or registration. Active users complained about high fees at much higher rates than other user types: 35% of active users said high fees are a challenge; only 22% of infrequent users said high fees are a problem. This indicates that high fees are not a barrier to active use for those with savings capacity. High charges were cited by only 2% of unregistered users as a reason for not signing up for SM. While affordability is always a priority for improving financial inclusion, fees do not seem to be a primary obstacle to signing up for SM.

Discussion: Constraints Affecting Men and Women

Women and men share many key constraints that affect their digital journey and inhibit them from actively using mobile banking. There is considerable demand for mobile banking: 56% of unregistered clients said they were likely or very likely to register for SM. However, both men and women who were not registered for SM were generally unaware of the service, providing low-hanging fruit to increase the use of mobile banking among SASL's clients.

Women and men also struggled with understanding how to use mobile banking and digital financial services, and the majority of respondents requested help to improve their understanding. Improving understanding of mobile banking and digital finance is relatively simple to implement—for example, through voice messages and informational materials, although this will take more effort than simple awareness raising. As I moved

along the digital journey, I began to encounter more difficult issues and a wider gender gap. Finally, I did see a clear gender gap in savings capacity: men are more likely to meet their savings goals than women. Having cash is a prerequisite for mobile banking, and those who do not have cash to transact will not have sufficient reason to utilize mobile banking. Unfortunately, women were less likely than men to have sufficient savings, likely contributing to the gender gap in mobile banking uptake. While this barrier is much more complex than awareness raising, it does fall within the scope of institutions attempting to improve financial inclusion.

Interestingly, 77% of respondents keep money in their mobile money wallet account; 32% of active users and 15% of infrequent users say they use SM for saving. While savings capacity is likely a prerequisite to saving money in mobile wallets, mobile wallets hold promise in improving the ability of women to make financial decisions (Riley, 2020). Mobile banking, financial literacy training, and other interventions may improve the ability of women to improve their savings capacity.

The data supports my hypothesis that women and men have common barriers to active mobile banking use (Hypothesis 1), and tentatively supports my hypothesis that earlier steps on the digital journey are not the primary constraints contributing to the gender gap in mobile banking among bank clients (Hypothesis 2). While this is true for lack of awareness and lack of understanding of mobile banking, it is not true of need to use mobile banking. Women lack sufficient savings to use mobile banking at higher rates than men, so they will not have the same need to use mobile banking.

Data: Key Constraints Affecting Women

In this section, I explore my second research question: What constraints disproportionately affect women? I also investigate whether there is evidence to support my third hypothesis that lower levels of digital literacy make a woman less likely to utilize mobile banking (Hypothesis 3), and to support my last hypothesis that increased decision-making autonomy is correlated with higher uptake of mobile banking (Hypothesis 4). I formed these last two hypotheses based on findings in the literature, and decided to look at confidence in security as a third potential constraint that emerged from the data.

While in many cases I did not find statistically significant differences in gender for a given constraint across all clients, I did find significant factors that make women less likely to be active users of SM. For example, non-registered women are less confident about security for digital transactions, although not all women lack confidence in security. While active female users of SM have high levels of digital literacy, all women who are not active users of SM lack sufficient digital literacy. Finally, I found a clear gender gap in independent decision-making power.

Digital literacy

There is a gender gap in digital literacy in the survey results, which is confirmed by regression models. Among women respondents 68% say they can perform mobile money transactions on their own, compared to 76% of men. Women are 26% less likely to be able to perform mobile money transactions without help from others (Table 5, Column 2, $P = .006$). When compared to men, all subsets of women are less likely to use mobile money on their own, except active female SM users. This difference declines with each user group, from non-registered users to infrequent users. The difference is greatest with non-registered users (26% less likely than men, Table 5, $P = .008$); slightly less for registered females who have never used SM (23% less likely, Table 5, $P = .008$); and further reduces in infrequent users of SM (18% less likely, Table 5., $P = .034$). These data indicate that increased confidence in using digital transactions that involve mobile money results in increased ability to actively use mobile banking. However, all these women user groups are less skilled in digital literacy than men.

Table 5. Clients Who Conduct Mobile Money Transfers Without Help from Others.

	(1) MM Transfer On Own	(2) MM Transfer On Own
NotRegF	-0.263***	
	(0.098)	
NeverUsedF	-0.227***	
	(0.085)	
InfrequentF	-0.176**	
	(0.083)	
ActiveF	-0.031	
	(0.067)	
Female		-0.256***
		(0.094)
AtleastJrHigh	0.563***	0.565***
	(0.112)	(0.112)
Constant	0.407***	0.406***
	(0.111)	(0.111)
Observations	242	242

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
Eight respondents do not use mobile money and skipped this question.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author

The gender gap in digital literacy could be due to education differences by gender (i.e., men in the sample could be more educated than women). However, the women in this study sample are highly educated. They were indirectly selected into this sample since they were more likely to have a formal bank account and could access an SM account. 77% of women and 70% of men in the sample completed at least junior secondary school. Also, the model controlled for education, although the differences persist when education is removed as a control.

Confidence of Security

Security is an important factor in deciding to use mobile banking, especially among women. Generally, I found a high degree of trust in digital transfers, with 74% of respondents saying they trust digital channels for making financial transactions. There is a difference among active and non-registered SM clients, as 87% of active female users say they trust digital channels to make financial transactions but only 54% of non-registered female SM clients trust digital channels for making financial transactions.

Table 6. Trust in Security of Digital Transactions and Digital Financial Services (DFS).

	(1) Trust DFS	(2) Very Confident of Security	(3) Trust DFS	(4) Very Confident of Security
NotRegF			-0.212**	0.027
			(0.096)	(0.068)
NotRegM			-0.025	-0.003
			(0.103)	(0.107)
Female	-0.167	-0.158	0.012	-0.186***
	(0.110)	(0.099)	(0.068)	(0.057)
AtleastJrHigh	0.132	0.051	0.126	0.051
	(0.131)	(0.100)	(0.132)	(0.101)
Constant	1.634***	0.286***	1.659***	0.288***
	(0.121)	(0.104)	(0.106)	(0.087)
Observations	249	250	249	250

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
* $p < 0.10$, ** $p < 0.05$, $p < 0.01$

Source: thesis author

Confidence in the security of digital transactions was a constraint for women, as non-registered female clients were 21% less likely to trust digital channels (whether mobile money or SM) than male clients (Table 6, Column 3, $P = .027$). There was a large difference between non-registered female and male clients who said they were confident

in digital transfers (54% female respondents versus 72% male respondents), although in the regression model this gender difference was not significant at the 95% confidence level ($F(1, 244) = 1.79$, $P = .182$).

There is also a gender gap among respondents who said they were very confident in the security of funds in digital transactions; 32% of men reported being very confident of the security compared to 19% of women. After employing sample weights and controlling for education, I am not confident at the 95% level that these differences persist in the population ($F(2, 247) = 1.43$, $P = .241$). However, fear of theft and concerns about security were the second-highest cited reasons for why unregistered clients did not sign up for SM, as mentioned by 34% of women. So security concerns appear to be a significant barrier to active use of SM among women.

Table 7. Gender Gap in Confidence of Security of Digital Transfers and DFS.

	(1) Trust DFS	(2) Very Confident of Security	(3) Trust DFS	(4) Very Confident of Security
NotRegF			-0.212**	0.027
			(0.096)	(0.068)
NotRegM			-0.025	-0.003
			(0.103)	(0.107)
Female	-0.167	-0.158	0.012	-0.186***
	(0.110)	(0.099)	(0.068)	(0.057)
AtleastJrHigh	0.132	0.051	0.126	0.051
	(0.131)	(0.100)	(0.132)	(0.101)
Constant	1.634***	0.286***	1.659***	0.288***
	(0.121)	(0.104)	(0.106)	(0.087)
Observations	249	250	249	250

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author

This gender gap in confidence could be because men in this sample had more overall practice using digital transactions. There was no significant difference between male and female respondents who reported frequently making calls and sending texts ("frequently" here means at least once per week). However, there was a significant

gender difference in using internet and mobile money use (see Appendix 2). Increased use of digital services may lead to increased confidence in security.

Agency

There were significant gender gaps in agency. Men are more likely to make independent decisions to open bank accounts and purchase phones than are women. To open a bank account, 78% of men said they made this decision on their own compared to 46% of women. Women are 59% less likely to made this decision on their own (Table 8, Column 1, $P = .001$). Unregistered women were 50% less likely to make this decision on their own compared to men, and this gender gap was statistically significant ($F(1,245) = 4.53$, $P = .034$)). To buy a phone, 94% of men said they made this decision on their own, compared to 61% of women; women were 35% less likely to make this decision on their own than men (Table 8, Column 3, $P = .001$).

Table 8. Agency Gender Gap: Clients Who Make Decisions Without Consulting Others

	(1) Bank Account Decision	(2) Bank Account Decision	(3) Phone Account Decision
NotRegF		-0.495***	
		(0.175)	
NotRegM		-0.021	
		(0.136)	
Female	-0.593***	-0.145	-0.345***
	(0.179)	(0.109)	(0.115)
AtleastJrHigh	0.224	0.210	0.008
	(0.264)	(0.264)	(0.171)
Constant	2.531***	2.559***	2.953***
	(0.213)	(0.201)	(0.128)
Observations	250	250	248

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author

If there were more young, unmarried men in the sample than women, that could account for this difference. However, women make up 75% of the sample who are under age 25, and 55% of the sample between ages 26 and 35. Since there was a higher proportion of young women than men in the sample, it is unlikely there are more

unmarried men than women in this sample. If unregistered clients are less educated than active SM users, education may be a confounding variable. The model controls for low education, although the difference persists when this control variable is removed from the model, indicating that education is not a contributing factor to this result.

Discussion: Constraints Affecting Women

What constraints disproportionately affect women? There is conclusive evidence of a gender gap in independent decision-making power, and evidence to support a gender gap in confidence of security and digital literacy. While I did not find gender gaps across user types, I did find significant factors that made women less likely to be active users of SM. This lends support to a tailored approach to tackling gender gaps based on certain factors, although perhaps not the factors one might expect.

All women who were not active users of SM had low digital literacy skills, regardless of whether they were educated. This has important implications for institutions seeking to reduce the gender gap in mobile banking. Interventions cannot assume that educated groups of women will have sufficient digital literacy to use digital financial services.

Non-registered women lacked confidence in the security of digital transactions, but not all women lacked this confidence. Women who actively use SM were much more likely to be confident in digital transactions. The data indicated that women had less experience using mobile money and mobile internet than men. Women who use digital financial services may be more confident of security than women who use digital financial services less frequently, pointing to a possible path for closing the confidence gender gap. More research is needed to understand the potential of this approach.

Finally, I found a clear gender gap in independent decision-making power. Dependency in purchase decisions and financial access decisions undoubtedly impacts women's confidence and ability to use financial services with autonomy, and is a key learning to take into account when developing solutions for narrowing the gender gap.

In-Depth Interview Findings

While the numbers tell a story, the in-depth interviews enabled me to fill in gaps and dive into reasons behind the survey responses. These interviews also allowed me to explore questions about the nature of constraints. For example, in the survey it was clear that women perceive security different than men, which prompts the question of whether women are more risk averse, or are they actually targeted in fraud attempts at higher rates than men.

The survey interviews also revealed ways women and men approach challenges as to whether barriers are surmountable or if they are key barriers that require thoughtful intervention to address. Both men and women were interviewed, which allowed me to identify differences in challenges; however, the challenges of women are the focus of the following findings.

Security

One of the clearest differences between men and women in the in-depth interviews was in the perception of security. When asked about gender-specific barriers, women often said that being a woman made her more likely to experience attempted fraud. While men occasionally mentioned fraud as a concern, it was not a prominent concern in the interviews.

All women mentioned fraud in the in-depth interviews, and most said this made them fearful. Women described attempted fraud as a constant challenge, giving the impression that people were lying in wait to compromise their account at "the least chance." Women emphasized the need to trust mobile agents, while also inferring that such agents are potential perpetrators of fraud. Numerous women experienced attempted fraud. One said that she was previously confident in using digital services, but attempted fraud made her less confident. Women with lower levels of education said having less education makes women more susceptible to attacks. Another woman said she had heard comments that suggest women are more easily scammed than men.

Women conveyed varying level of confidence in warding off attempted fraud. For some, fear of fraud was a deterrent to using SM. Others were wary but confident that they could prevent fraud by being careful and protecting their password. One woman was a former mobile money agent and had no fear of fraud due to her personal experience: she had thwarted enough fraud attempts to be confident in her ability to keep her digital accounts secure.

Digital Skills and Understanding

Many women mentioned in the interviews that English was helpful in enabling them to acquire digital skills. One male respondent said that even though he was not well-educated, his ability to read English enabled him to follow instructions and learn on his own. For those who are not highly educated, training is often important—one mentioned using the service as she was taught, inferring that she was not able to learn other digital transactions on her own.

Enhanced understanding might be an approach to tackling fears of fraud. In one interview, a woman explained that she was fearful of fraud, thinking that anyone who could access her phone could access her mobile wallet or bank account. When her children explained that the accounts are password-protected and safe if she did not share her password, she gained confidence and now regularly uses mobile money. Given the findings that women are more actively pursued in fraud attacks, training will need to go beyond how security features work to include how they can be exploited, and women must be equipped to deal with these attempts.

Savings

Savings goals were important to women. Some savings goals were household-centered, while others were business-centered. Many respondents said that mobile banking made it easier to save because they can easily deposit money into their account. Several respondents said mobile money and mobile banking make it easier to deny requests for cash from friends and family, allowing them to retain profits. Many also said mobile banking as a replacement for cash allowed them to limit spending on things they did not need. The general sentiment that mobile money makes it easier to save can be reinforced in financial literacy trainings or marketing messages to encourage savings and attract users with savings ambitions. Since access to cash is an enabler and prerequisite to active mobile banking use, savings messages may lead to greater use over time.

Network

Many complain that poor mobile network connections delay transactions or make DFS less convenient. However, none of the in-depth interviews inferred that poor network connections prohibited their use of SM or made them consider discontinuing the service. Nearly all respondents had experience with multiple networks and held multiple SIM cards, indicating that if one network was poor they were able to switch to a different network. While many interviewees lived or worked in areas with poor coverage, they also knew of areas where coverage was better and could factor this in when making digital transactions. While poor network coverage does appear to be a frustrating challenge, it does not appear to be the main constraint to active mobile banking use.

Phone Type

Most women interviewed utilized a feature phone, and one even borrowed a phone at the time we interviewed her. However, it became clear that women move between smartphones and feature phones, and phone ownership. Surprisingly, all women had owned a smartphone at some point in the past, and many plan to own a smartphone in the future. This indicates that phone ownership may be fluid and will probably be less of a barrier in the future. Indeed, as smartphone ownership rates increase, there may be opportunities to improve usability of mobile banking through apps that reduce complexity.

Chapter V

Next Steps

This research highlights several factors that inhibit women from actively using mobile banking. Some constraints affect both men and women, presenting ways to close the gender gap through attention to women's needs and opportunities. Other barriers that overly affect women are vital to address in order to close the gender gap, as many of these factors will remain systemic without active intervention. These factors can be addressed by financial institutions and NGOs.

Financial Institutions

Financial institutions aiming to close the gender gap in mobile banking must address constraints that disproportionately effect women. Where men and women lack similar skills and resources, financial institutions can work to narrow gender gaps through training that specifically address women's experiences (e.g., safety concerns and lack of digital literacy), using content designed to be accessible to women, and incorporating peer-to-peer mentorship. Generic training has been shown to have lackluster results (McKenzie & Woodruff, 2017). However, highly contextualized training has greater promise of effectiveness; training that uses trained facilitators with similar backgrounds as recipients, and incorporates accessible content based on real examples, will be more likely to result in better learning and outcomes (Dalton, et al., 2019; Drexler, et al., 2014). Messaging may appeal to women who are likely to be active

users (savers), but training and messaging should also encourage saving behavior. To actively close the gender gap, SASL and other financial institutions in Ghana must proactively address the barriers that effect women.

Address Security Fears Through Education and Internal Controls

Fear of fraud disproportionately affects women. This is a legitimate fear since women are targeted more than men in fraudulent attacks, as the in-depth interviews indicated. To address this fear, financial institutions can equip women to deal with fraudulent activity through a robust training program designed specifically for women in their context (Drexler, et al., 2014). The in-depth interviews showed that women with greater knowledge of fraud tactics were more confident and less fearful of fraud.

Financial institutions should first document specific fraud tactics in their context, and ways women in the community can and have thwarted these attacks. Then the financial institutions should create content that highlights digital security best practices that have been tested and used by peers. After this assessment, financial institutions should create materials and messaging to address common fraud and scam tactics, and include testimonials of ways women have encountered and dealt with fraud. Training materials should introduce specific best practices in digital security employed by experienced users that have been shown to protect against fraud, such as keeping passwords safe, and strategies to thwart common fraud tactics using real-life examples and testimonials. Training can be delivered through printed materials such as brochures but can also include voice message campaigns and should include in-person components.

In this survey, the top ways women preferred to be trained was in person by staff (69%), or voice messages from SASL (26%). Training that included quality printed content but had no in-person aspect were ineffective in some contexts. However, these same materials, paired with in-person assistance, was empirically shown to increase the effectiveness of knowledge retention and business performance (Brooks, et al., 2018; Dalton, et al., 2019). When paired with relevant, contextualized training focused on self-learning, these interactions can be relatively light-touch (e.g., two 30-minute, one-to-one sessions on predefined topics) to markedly increase retention and outcomes (Dalton, et al., 2019). SASL and financial institutions should consider incorporating in-person components to their message campaigns for improved results.

Women also expressed fear of fraud coming from agents. Whistleblower channels are vital and should be actively promoted. Procedures to handle complaints should be reviewed to ensure that staff are able to handle complaints of fraud or theft. Thinking into the future, as smartphone penetration rapidly increases, financial institutions can consider creating mobile apps with improved security features, including biometric authentication (e.g., thumbprint readers).

Tailor Outreach Approach by User Type

This research identifies unique profiles for various user types, including active users, infrequent users, and non-registered clients, each of which required tailored approaches to encourage uptake. Financial institutions can increase active use by increasing registration among unregistered users, by encouraging non-users to make their

first transaction, and increasing use among infrequent users. Each user type requires a different approach.

To address the unregistered user segment, engage women in outreach campaigns to increase registration among women while accounting for digital literacy gaps. Most female SASL clients who were not registered with SM would like to sign up, although about half were not aware of the service. However, a barrier to active use is low digital literacy, so contextualized, accessible training will be required to facilitate active mobile banking use. Accessible content, using contextualized examples, has been shown to improve learning outcomes and results of trainings that include complex topics like financial literacy and digital literacy (Drexler, et al., 2014).

The in-depth interviews revealed that women who were not able to learn mobile banking on their own could learn and retain the steps needed to conduct specific transactions. Training content should be developed by first identifying proven ways local women have improved financial or business success through specific digital activities and incorporating these specific use cases and testimonials into training materials. Financial institutions can educate clients on usage through voice messages and accessible trainings using testimonials and local facilitators to improve digital literacy.

Financial institutions can raise awareness through voice messaging, branch-level goal setting, and incentives structures. Voice messaging is a cost-effective way to raise awareness and understanding of SM. Messaging should focus on motivations for use tailored to women's experiences and daily routines. Motivations for SM adoption are similar for men and women: on-demand account access, time savings, reduced travel cost, ability to save, and increased security by not holding cash (listed in order of

response frequency). Financial institutions should pair these voice messages with in-person information sessions where clients can ask questions and receive support.

To address the registered user segment, financial institutions can engage non-users and increase the frequency of use in infrequent users. The non-user group requires more empathy and accessible training—these are users who have signed up but (1) do not understand how SM works (37%); (2) do not have sufficient savings capacity (26%); or (3) need help completing the first transactions (18%). Financial institutions could consider employing gender champions at the branch level to provide hands-on training to assist non-users with their first transaction. Women in the infrequent user group may benefit from multiple touchpoints, including voice messages and in-person information sessions.

Financial institutions can build momentum for mobile banking registration and active use by tailoring messaging to female users who are likely to use mobile banking. People with low savings capacity are not active users, which shows that mobile banking is not beneficial for everyone. However, financial institutions can encourage savings behavior by training women to improve their savings habits through training, or regular voice messages, or by targeting marketing efforts to women who are motivated to save.

Non-Government Organizations

Non-government organizations also have a role to play in improving financial access among women through mobile banking. This includes equipping women to deal with fraud attacks and improving independent decision-making ability.

Women face myriad threats from multiple actors attempting to steal their money: new ways of transacting bring out new methods of theft. The in-depth interviews showed

that women were suspicious of agents. NGOs focusing on financial inclusion must address this fear of fraud against women in order to gain the confidence they need to make digital transactions. NGOs can conduct training, raise awareness, and advocate for victims of fraud while pressing for better regulation.

Lack of agency also holds women back from achieving equity in financial inclusion. A comprehensive review falls outside the scope of this research, however, the reviewed literature revealed that many women sacrifice business profits in order to address household expenses. This survey confirms many women have desires to grow their business. Training conducted by NGOs can include robust financial literacy training developed to improve decision-making autonomy by equipping women with the knowledge and tools to separate business and household expenses. Again, this training must be highly relevant and accessible to trainees.

NGOs should identify financial management practices that have been proven to lead to higher profits among local business owners, incorporate accessible examples and testimonials, and include in-person assistance or mentorship from people with similar background as clients. Improved financial literacy will allow women to retain profits within their businesses and achieve their savings goals.

Mobile banking could be employed as an active strategy to increase women's bargaining power in profit retention. Training could emphasize the benefits of savings, and messaging should be tailored to savings goals that improve business profitability while providing cash to pay for household expenses and children's education.

Chapter VI

Conclusions

If one walks in markets in West Africa, he or she will likely observe a vibrant economy comprised of fish sellers, fabric sellers, and shop owners—many of them women. Women in SSA form an essential part of the economy in vital industries such as farming and food production, and they play a vital role in household financial management. The research put forth in this thesis contributes important, sometimes surprising, insights into the barriers women face while conducting the financial management of their businesses, households, and economic activities.

I studied the adoption of mobile banking, a relatively new and nascent technology. Lessons learned from gender gaps in mobile banking adoption can be applied more broadly in digital adoption and other innovations essential for economic development. Systemic challenges women in SSA face are not unique to mobile banking and are indicative of challenges in other areas of economic development.

It is common for women to be less educated than men, on average, in developing countries. Yet this research demonstrated that education alone is not enough to give women the skills needed to adopt new technologies. Educated women were selected to be part of this sample. Nevertheless, they had lower digital literacy than men, and they were less able to perform simple transactions on their phone than men. However, when women were shown how to use a service and then utilized it according to their needs, there was potential for closing the digital literacy gap through training.

Generally, if someone holds a bank account, an account to send money digitally, and runs their own business, one assumes that this person generally knows enough about their context to make their way in the world. We can assume that the group of women sampled in this survey are cognizant of their surroundings; they have shown initiative in obtaining these accounts, and most run their own business. Yet this group of women fear fraud and theft far more than do men, and the in-depth interviews indicated these fears may be well-founded. The women in these interviews demonstrate that being a woman makes it more likely to be a target for fraud attacks. A woman in Ghana must constantly guard against fraud attempts.

This research also showed that women have less decision-making power than men, and women make decisions on their own at lower rates than men. It could be argued that women are more consultative than men but still have final decision-making power. Further research is needed to understand whether women make the final decision at similar rates as do men. However, it is significant that men make decisions without consulting men at higher rates than women. In cases where an extra level of consultation is needed (e.g., in the case of opening a bank account, purchasing a phone, or signing up for mobile banking), such consultation could constitute a further barrier to adoption.

There is a gap between mobile banking and financial inclusion in SSA. This research sheds light on some of the constraints that contribute to this gap and presents lessons and suggestions for policies that could help close the gender gap if they were implemented. These lessons are not unique to the challenge of mobile banking adoption, and they have implications for adopting new technologies and improving financial inclusion in SSA.

Women must be equipped to deal with attempted fraud; their fear of fraud is justified, and they must be trained to understand and prevent fraud attacks. Development actors cannot assume that a woman with education has high levels of digital literacy, but we also cannot write off low levels of digital literacy as an unsurpassable barrier. Women in the in-depth interviews, who could not figure out this technology on their own, were shown how to use it and subsequently adapted the technology to their needs. Finally, low decision-making power among women is a longstanding and systemic issue that development actors should address as a cross-cutting issue in programming.

A new technology like mobile banking shows promise for providing women with more choices and the ability to manage their finances and gain financial independence—or this new technology can exacerbate systemic challenges and widen gender gaps. This is not an issue that can be allowed to run its course, or to simply trust an entrepreneurial spirit to correct. Development actors have a responsibility to correct systemic divides so as to create equal opportunities for women in SSA. Fortunately, we have the tools to address these challenges, and the empathy and deliberate rollout of new technology hold tremendous power to reduce gender divides.

Research Limitations

Mobile banking and the financial sector are not the same across SSA, and nuances in Ghana may limit application in other contexts. However, institutions are likely to encounter many of the same constraints in other contexts in SSA.

Topics for Further Research

Further research could examine constraints to adoption among women in other contexts. Surveys have inherent limitations in assigning causation, and an experimental approach could improve our understanding of specific constraints.

This research opens the way to several potential pathways for experimental research. The data indicate that women have less experience in internet use and the use of mobile money, which may be one reason why they lack the necessary digital literacy skills and confidence in security. An experimental approach could reveal whether increased use of digital financial services leads to confidence in improved digital literacy and confidence in security for women.

This research also highlights the gap in agency based on whether women make decisions with or without consulting others across a range of settings. Experimental design could help to understand whether women in Ghana make the final decision despite consulting others, or if this consultation limits their independent decision making.

Finally, to address these constraints, institutions need cost-effective ways to reach women with training and support. Experimental design could test whether voice messaging or other digital channels are effective to train women in digital security and to train women how to use mobile banking.

Appendix 1

Other Regression Tables

Table 9. Independent Mobile Money Transfer Ability and Phone Purchase Decision Models

	(1) MM Transfer On Own	(2) Phone Account Decision
NotRegF	-0.093	-0.203
	(0.090)	(0.142)
NotRegM	0.066	0.013
	(0.077)	(0.063)
Female	-0.114**	-0.144
	(0.048)	(0.090)
AtleastJrHigh	0.564***	0.003
	(0.112)	(0.172)
Constant	0.351***	2.945***
	(0.086)	(0.133)
Observations	242	248

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
In column 1, eight respondents do not use mobile money and skipped this question.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author.

Appendix 2

Gender Differences in Phone Use Activity

Table 10. Gender Differences in Phone Use Activity

	(1) Call Often	(2) Text Often	(3) Use Internet Often	(4) Use phone for SM	(5) Use phone for WhatsApp/messaging
Female	-0.063	0.142	-0.972**	-0.103***	-0.228**
	(0.143)	(0.282)	(0.392)	(0.034)	(0.102)
AtleastJrHigh	0.279	1.017***	1.363***	0.036**	0.295***
	(0.224)	(0.294)	(0.376)	(0.016)	(0.078)
Constant	3.700***	2.572***	2.323***	0.097***	0.228**
	(0.175)	(0.278)	(0.374)	(0.027)	(0.096)
Observations	250	250	249	250	250

Notes:
Standard errors in parentheses.
Model incorporates survey weights.
All strata groups included.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: thesis author

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