

Financial Inclusion in Bangladesh Through Mobile Financial Services

A Case Study on Marginal Agricultural Peoples of Bangladesh

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Abstract

In Bangladesh, financial inclusion has been a decades-long journey to include segments of the population with limited access to formal finance. This journey began with microcredit and has since evolved to cover all aspects of financial inclusion—from access, usage, to quality. Today, the use of mobile phones for financial transactions is commonplace in Bangladesh. People are accustomed to digital financial services, agent banking, branchless banking, and mobile money although marginal people from the agriculture sector lagged from digital services. The thesis aimed to use mobile financial services to develop a sustainable system for farmers in rural regions.

In this research report, an attempt will be made to understand the customer journey of a marginal agriculturist, and their pains and gains will be identified to improve digital mobile services for financial inclusion in Bangladesh. This study explored the complexities of improving financial inclusion through technological interventions, focusing on the transformative potential of Mobile Financial Services (MFS) for marginal farmers in Bangladesh. The study looked at the MFS market as it is now, assessed the particular difficulties that farmers confront, and offered a thorough list of suggestions for raising the effectiveness and accessibility of services.

Using a qualitative methodology that integrates the Business Model Canvas (BMC) and Service Design, the study clarified the existing MFS usage patterns, preferences, and restrictions among marginal farmers. It pointed out important obstacles include small rural agent networks, intricate transaction procedures, inadequate integration with farming operations, and a dearth of customized financial solutions.

The investigation's key findings showed that although MFS has advanced significantly in urban environments, its adoption in rural agricultural domains is still developing. The report emphasized how important it is to strategically extend agent networks into rural areas, streamline transaction processes, and incorporate MFS into the larger agricultural value chain. It also highlighted the creation of tailored financial products to meet the complex requirements of the agriculture industry.

The report suggested a symbiotic strategy that includes strong infrastructure, government cooperation, policy support, and financial literacy programs created especially for marginal

farmers to close the gaps that have been found. To promote MFS acceptance and continuous use, it also emphasized the significance of user-centric service design, which incorporates feedback loops and the function of incentive programs.

The study ends with a proposal for an inclusive MFS model that highlights the significance of gender concerns and includes women, who are vital to family financial management and agriculture. The study's goal of creating a more inclusive financial ecosystem that can support marginalized farming communities in Bangladesh's economic development and empowerment is summarized in the abstract.

Language: English

Keywords: Service Design, Financial Inclusion, Digital Technology, Mobile banking, Agriculture sector of Bangladesh

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1 Introduction

Mobile banking services have been instrumental in increasing financial inclusion in Bangladesh. According to the Bangladesh Bank, the country's national bank, the number of mobile financial service accounts will exceed 100 million by 2020, accounting for more than 60% of the adult population (Huda et al., 2020). Mobile financial services (MFS) enable users to access financial services using their mobile phones rather than a conventional bank account. This has been especially significant in Bangladesh, where a substantial proportion of the population is unbanked or underbanked, and traditional banks' reach is limited, particularly in rural areas.

I have been working at commercial bank since 2011, for a state-owned commercial bank from 2011 to 2014, and since then, I have worked for a private commercial bank, Al-Arafah Islami Bank Ltd. In the course of my professional development, I have come to understand the critical importance of achieving financial inclusion for underbanked groups, especially for marginalized people. This motivated me to study on Al-Arafah Islami Bank Ltd.'s exclusive mobile financial solution, Islamic Wallet. The objectives of my organization are to improve financial inclusion and services for underprivileged populations, and by doing so, contribute to the increased economic and social well-being of our community. The insights and findings from this research project will be incorporated into my organization's operations and strategy.

The purpose of this research is to explore the effect of Mobile Financial Services (MFSs) on financial inclusion of marginal farmers in Bangladesh. MFSs are gaining favor among the public in Bangladesh due to their speed, ease of access, and a variety of other factors, but the rural sector remains unstable (Madan, 2020). Bangladesh Bank and other relevant Bangladeshi agencies are working tirelessly to get this industry off to a flying start. This study is one example, and it aims to investigate the effects of MFSs on the financial inclusion of Bangladesh's agriculture sector.

1.1 Current Scenario of Mobile Financial Services

The first MFSs was launched by Dutch-Bangla Bank Limited (DBBL) in Bangladesh in 2012, but the full-fledged operation required another two years. Presently, 28 banks are licensed to provide MFS, and many more are awaiting approval. Although 28 institutions have licenses, only 13 offer services (Bangladesh Bank, 2023). Financial transactions have been transformed by mobile financial services (MFS), which have increased their accessibility and convenience. These services offer a variety of features that simplify daily transactions for millions of individuals, especially in regions with undeveloped banking infrastructures.

The "cash-in" procedure is one essential MFS service. In this process, a consumer visits a mobile financial service provider representative and specifies the desired cash-in amount to begin a transaction. The customer's obligation to enter their account number and the cash-in amount in the agent's register before giving them the cash is crucial to the process. The agent is then tasked with depositing the funds into the customer's account. This activity is verified via messages sent to both parties' mobile phones by the MFS provider, serving as a receipt and guarantee that the transaction was successful. The "cash-out" service, in contrast, accomplishes the opposite goal despite using a similar methodology. Customers who want to make a withdrawal must go to an agent's location and enter their account number and the amount they wish to withdraw into the agent's register. The interactive component of the procedure necessitates that the user phone a service number, navigate a system, and provide vital data such as the cash-out amount, the agent's identity, and a security code. When everything is done, the MFS provider notifies both the customer and the agent, and the agent then pays the customer.

Services like money transfers are another example of how adaptable MFS is. Money transfers, as opposed to cash-in and cash-out, give clients the freedom to transfer money on their own without assistance from a salesperson. Customers can transfer funds by contacting a designated service number and inputting the recipient's mobile banking information, the transfer amount, a secure PIN, and other required authentication information. Messages confirming the successful transfer of funds are delivered to the sender and recipient at the conclusion of this digital transaction.

Additionally, MFS covers business dealings, particularly shopping. The procedure is similar to money transfers, but monies are given to businesses in exchange for the items or services they have purchased. Customers make payments by wiring the required sum to the retailer's mobile banking account, a simple process that encourages transactions without cash. In addition to the services stated above, MFS is multipurpose and offers a platform for numerous more crucial transactions. These include, but are not limited to, buying bus tickets, paying utility bills, and buying talk time for a cell phone. The breadth of offerings emphasizes both the efficiency and convenience provided by mobile financial services as well as their revolutionary effects on both everyday commerce and financial inclusiveness. (Khan et al., 2021)

1.2 Thesis Process Chart

A visual representation of the various stages and tasks involved in completing a thesis is provided in this thesis process chart (see Figure 1). During the first seminar, on April 10, 2023, important components of the thesis such as research protocol, literature reviews, objectives of the study, theoretical background, methodology were submitted.

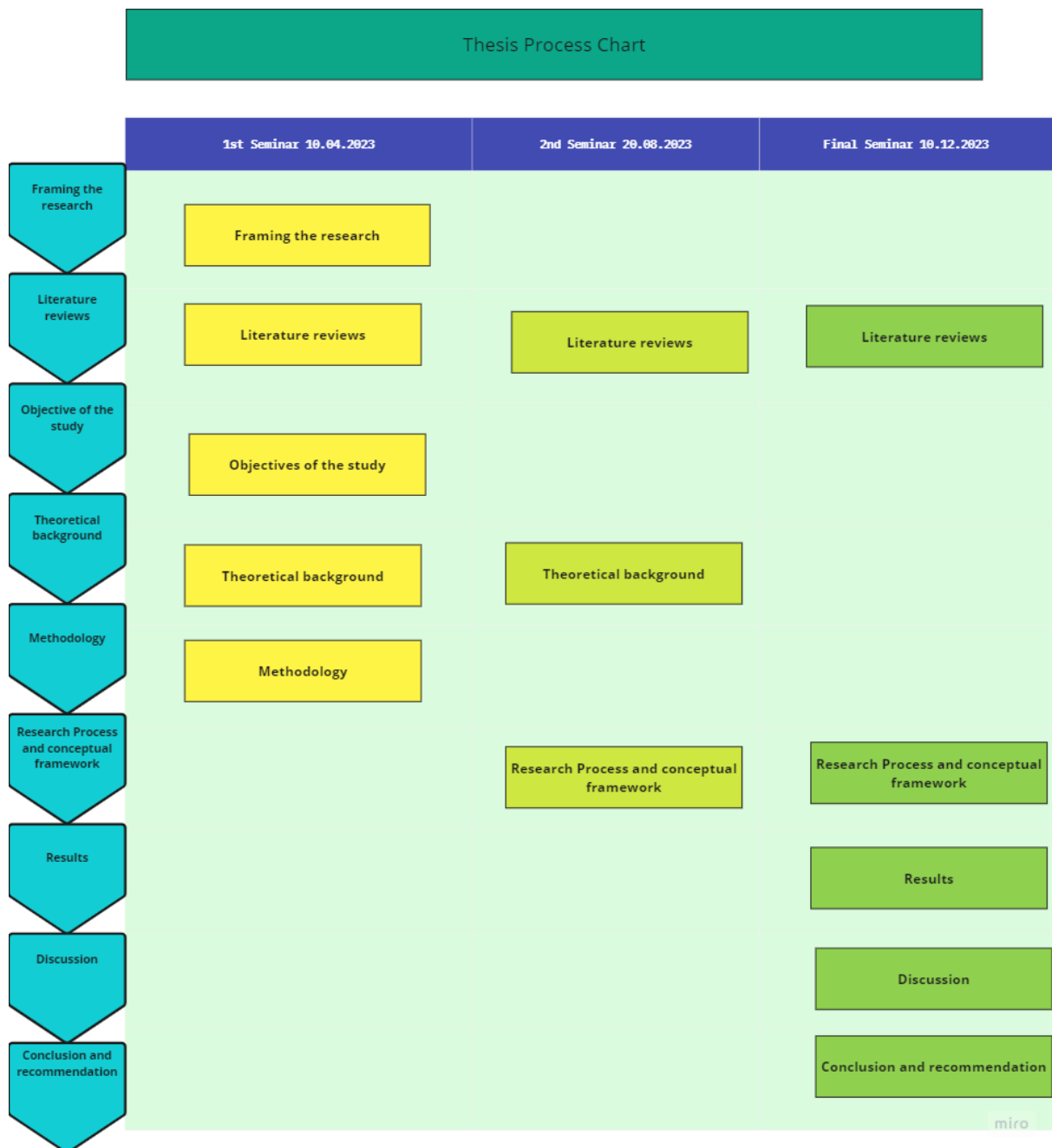


Figure 1: Thesis Process Chart

After successful completion, on September 06, 2023, by the end of second seminar, further literature, theoretical background, research process, empirical study and conceptual framework were completed. On November 18, 2023, the final part of thesis was presented and the literature review, research process and conceptual framework, results, discussion, and conclusion were conducted.

1.3 Problem Area / Aim: Who, How, What

Agriculture is an essential part of the economy. As the fastest-growing economic sector in terms of food security, employment prospects, and increased purchasing power, it presents enormous opportunities. However, Bangladesh falls far behind in terms of the expansion and development of the agricultural industry (Titumir, 2021). The thesis sought to create a sustainable system for farmers in rural areas using mobile financial services. The issues encountered by customers throughout their customer experience must be implemented in accordance with the methods.

The thesis attempted to develop remedies for the problems with the selected services. This thesis sought to identify issues and forge solid connections between the agricultural sectors of different countries and mobile digital financial services. Bangladesh's agriculture industry now faces a variety of difficulties (Rahman et al., 2020). Issues were identified through surveys and personal experience from numerous sources. On the other hand, services are being developed and improved to aid in the establishment of a sustainable system through financial inclusion (Aziz et al., 2021).

This thesis aimed to address the service's pain points and client issues. Methods and techniques were used to establish and enhance the current services as well as lessen the issues. The management of mobile financial services and the rural agriculture sector are the workshop's target audiences.

1.4 Purpose of the Thesis

The purpose of this thesis is to investigate the problems and difficulties that people involved in marginal agriculture face during financial transactions. It intends to use a service design approach to improve mobile financial services targeted at the needs of this demographic. Furthermore, the thesis aimed to identify the fundamental reasons why mobile financial services are not easily available to these people. Difficulties and limitations that prohibit such services from being easily accessible to marginal agricultural people. This thesis aims to fill gaps in the existing literature by providing new ideas and perspectives backed up by empirical study and rigorous research.

1.5 Research Questions

The thesis research questions dive into the specific issues and difficulties encountered by customers using mobile financial services. It analyzes the numerous activities for which farmers use these services, with the goal of better understanding the breadth and nature of their financial connections. Furthermore, the thesis investigates how service design concepts might be used to improve mobile financial services, with a special emphasis on boosting financial inclusion in Bangladesh. Examining potential changes and innovations that could make these services more accessible and helpful to the target audience is part of this process. Throughout this study the answers to these questions will be solved.

1. What are the pains experienced by the customers using mobile financial services?
2. For what types of activities do farmers use mobile financial services?
3. How can mobile financial services be improved by service design to help the financial inclusion of Bangladesh?

1.6 Theoretical Frame of Reference

The theoretical frame of reference of a thesis is what guides the research and provides a basis for interpreting the results. It includes assumptions, concepts, theories, and models that are used to define research problems, develop hypotheses, or research questions, and analyze the data. The frame of reference helps to establish the scope and limitations of the research and provides a context for understanding the significance and implications of the findings. It is typically based on a review of relevant literature and provides a theoretical foundation for the study (Karus et al., 2022). In this framework financial inclusion, mobile services, marginal client groups, the operating environment in Bangladesh, service design theories will be focused on. Figure 1 shows the Theoretical Frame of Reference.

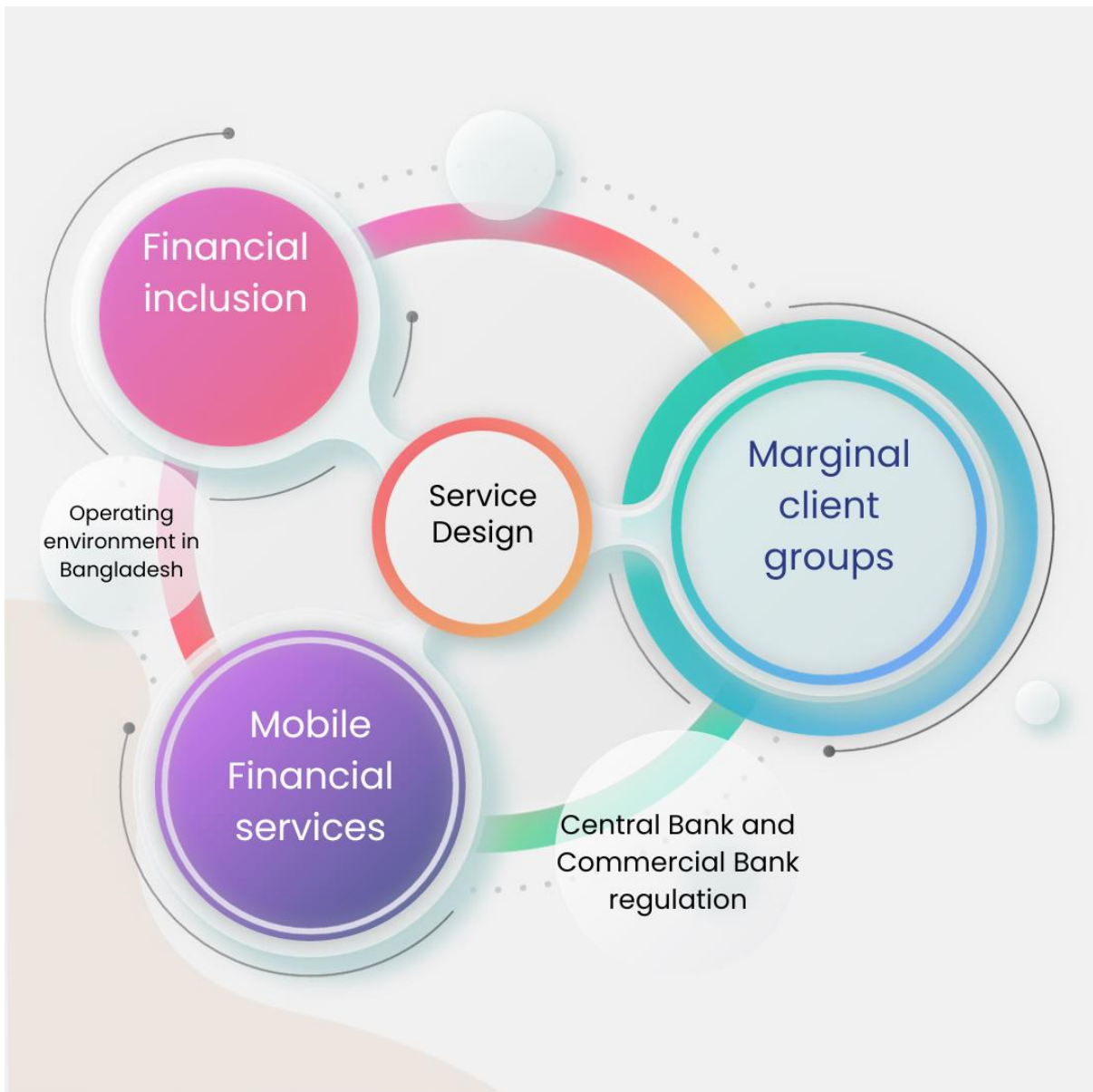


Figure 2: Theoretical Frame of Reference

2 Theoretical Background

The theoretical background of the thesis focuses on the key concepts and principles that underpin financial inclusion and mobile financial services. Financial inclusion is widely recognized as a key driver of economic growth and poverty reduction, as it enables individuals and businesses to access credit, savings, insurance, and other financial services that can help them to build assets, manage risks, and invest in productive activities (Ofosu-Mensah Ababio, J et al., 2021). MFS are a form of financial inclusion that has gained significant traction in recent years, particularly in developing countries where traditional banking infrastructure is limited (Anakpo et al., 2023). MFS leverages mobile technology to provide financial services, such as money transfers, bill payments, and microcredit, to people who have limited or no access to formal banking channels (Hasan et al., 2023). MFS is often provided through mobile

network operators (MNOs) who partner with banks to offer financial services using mobile devices.

In the context of Bangladesh, where most of the population is engaged in agriculture and live in rural areas, financial inclusion is particularly important (Aziz et al., 2021). Marginal agricultural people often lack access to formal banking services, which can limit their ability to invest in their farms, access credit, and manage their finances effectively (Quddus et al., 2020). MFS has the potential to address this gap by providing a cost-effective and accessible alternative to traditional banking services (Akhter et al., 2020). The theoretical background of this thesis draws on relevant literature and theories related to financial inclusion, MFS, and rural development. The key drivers and barriers to financial inclusion in Bangladesh, as well as the factors that influence the adoption and usage of MFS among marginal agricultural peoples, are examined. Additionally, the potential impact of MFS on financial inclusion, rural development, and poverty reduction in Bangladesh is explored.

2.1 Financial inclusion

Financial inclusion is a global development goal that has gained increasing attention in recent years. It is widely recognized that access to financial services, particularly in developing countries, can contribute to poverty reduction, economic growth, and social inclusion (Arner et al, 2020). In Bangladesh, financial inclusion has become a key priority for the government, with a number of initiatives aimed at expanding access to financial services to underserved populations. Mobile financial services (MFS) are an innovative solution that has emerged in recent years, which leverages mobile technology to provide affordable and accessible financial services to people who have limited or no access to formal banking channels (Pazarbasioglu et al., 2020). MFS has gained significant traction in developing countries, particularly in Asia and Africa, where traditional banking infrastructure is limited (Anakpo et al., 2023). In Bangladesh, MFS has emerged as an important driver of financial inclusion, particularly in rural areas where most of the population is engaged in agriculture. In 2012, there were approximately 16 million people in Bangladesh, with only 13% having bank accounts and more than 95% using mobile phones (Asian Development Bank (ADB), 2013).

Despite accounting for only about 17% of Bangladesh's GDP, agriculture employs nearly half of the country's workforce. (CIA world factbook). Several studies have examined the impact of MFS on financial inclusion in Bangladesh. For example, a study by (Akhter et al., 2020)

found that MFS has a positive impact on financial inclusion, particularly among low-income and rural populations. Another study by (Afroze et al., 2022) found that MFS adoption is positively associated with financial inclusion, and that MFS usage is driven by factors such as convenience, security, and trust.

However, despite the potential benefits of MFS, there are still a number of barriers to financial inclusion in Bangladesh. For example, a study by (Aziz et al., 2021) found that lack of awareness, limited literacy, and lack of trust in financial institutions are key barriers to financial inclusion among rural populations. Another study by (Potnis et al., 2017) found that regulatory barriers, such as limitations on mobile money transaction sizes and restrictions on the types of transactions allowed, can hinder the growth of MFS in Bangladesh. In the context of marginal agricultural peoples in Bangladesh, who often lack access to formal banking services, MFS can play a critical role in improving financial inclusion. A study by (Akhter et al., 2020) found that MFS usage is positively associated with higher levels of financial inclusion among small farmers in Bangladesh.

Overall, the literature suggests that MFS has the potential to improve financial inclusion in Bangladesh, particularly among marginalized populations. However, there are still a number of barriers to overcome, including regulatory barriers, lack of awareness, and limited literacy. In order to fully realize the potential of MFS for financial inclusion, it is important to address these barriers and continue to expand access to affordable and accessible financial services in Bangladesh.

2.2 The Operating Environment in Bangladesh

Financial inclusion for marginal farmers using mobile financial services (MFS) in Bangladesh is a complex topic that includes a range of socioeconomic, technological, and governmental aspects (Aziz & Naima, 2021). Agriculture is practiced by a sizeable portion of Bangladesh's population, though frequently on a small scale and with scarce financial means (World Bank, 2018). Due to issues such as a lack of adequate collateral, poor financial literacy, and the informality of their economic relationships, these marginal farmers often do not have access to standard banking services (Afrin et al., 2017).

Bangladesh's technical environment presents both difficulties and chances. Even while mobile phone usage has significantly increased across the nation, there are still access differences between urban and rural areas, especially when it comes to smartphones and

internet connectivity (GSMA, 2020). The government's Digital Bangladesh effort tries to promote access to digital technology, but its effectiveness and reach might vary, especially in more rural areas (Siddiquee, N. A. 2016). Another important element in the equation for financial inclusion is the regulatory framework. The central bank and government of Bangladesh have implemented several laws and programs to encourage financial inclusion. The complexity and changeability of these regulations, which include topics like transaction limitations and agent banking, can occasionally make it difficult for service providers to comply with them (Mujeri, M. K., & Azam, S. 2018).

Additionally, several banks and non-banking organizations compete in Bangladesh's market for mobile financial services. Although strict regulatory control is required to ensure fair practices and prevent market dominance, this competition can encourage innovation (Gazi et al., 2021). The adoption of formal financial services among rural communities is significantly influenced by cultural factors, particularly those relating to trust and risk perception. The adoption of these services may be hampered by historical skepticism and a general lack of familiarity with them (Uddin et al., 2020). Furthermore, Bangladesh's susceptibility to diverse environmental and climatic hazards highlights the demand for adaptable, quick-response financial services, such insurance products, that can assist lessen the negative effects of natural disasters on agricultural output (World Bank, 2018).

To effectively design and operate these services, policymakers and service providers must consider a convergence of socioeconomic, technological, regulatory, market, cultural, and environmental aspects. For these communities to be economically empowered and resilient, it is crucial to make sure that these services are readily available, reasonably priced, and specifically designed to fulfill the needs of marginal farmers (Siddiquee et al., 2016).

2.3 Commercial Bank and Central Bank Regulation

Bangladesh's financial industry is governed by the Bangladesh Bank, the country's central bank. The Bangladesh Bank was founded on December 16, 1971, and serves as the banking sector's primary regulatory agency. Its primary responsibilities include regulating and monitoring banking and financial institutions. To maintain the stability and effectiveness of the banking system, the Bangladesh Bank, which serves as both the nation's central bank and the regulatory body overseeing the banking industry, has put in place a thorough set of rules and regulations. These steps, which show the bank's dedication to upholding a stable financial climate, contain detailed guidelines for several areas of banking operations.

The Operation of Agent Banking in Bangladesh guideline, which describes the framework for

extending banking services through agents and boosting financial inclusion, is one of the most important documents. This is especially important in rural areas with limited access to standard financial services. Furthermore, the Bangladesh Bank has provided detailed guidelines for opening a bank in the nation. These guidelines are intended to make sure that newly established banks have good governance and risk management procedures in place. Special emphasis has also been paid to Islamic finance, which is founded on Shariah principles. Banks are guided by Islamic finance guidelines when providing financial services and products that adhere to Islamic law, which forbids speculative and interest-based operations. Another essential component of the regulatory structure is the Prudential Banking Regulations. These rules are designed to make sure banks follow solid corporate governance principles, manage risks skillfully, retain sufficient capital, and conduct business in a safe and sound manner. Standards for the creation of Non-Resident Bangladeshis (NRB) banks have been created for NRBs who are interested in banking activities. These guidelines support the NRB community's involvement in the nation's banking industry by attending to their requirements and situations. Because they adhere to Basel III norms, the Guidelines for Risk-Based Capital Adequacy are especially important. With these changes to the Regulatory Capital Framework, banks will be more resilient to financial shocks because of the emphasis on keeping adequate capital buffers to absorb possible losses.

To guarantee that bank directors are knowledgeable and prepared to make choices that are optimal for the bank and its stakeholders, Policy Guidelines for Bank Directors have been established. These rules address things like the duties of directors, conflicts of interest, and the requirement for open decision-making procedures. As part of a larger effort to encourage ecologically friendly practices in the banking industry, Green Banking Guidelines for New Banks have been introduced. These recommendations urge newly established banks to implement environmentally responsible practices and regulations. Finally, a framework for non-bank financial institutions to conduct themselves responsibly and ethically is provided by the Code of Conduct for Financial Institutions Other Than Banks. This code addresses several facets of their business operations, such as transparency, customer service, and adherence to legal and regulatory obligations. In Bangladesh, in addition to the central bank regulations, there are various categories of banks, including state-owned commercial banks, private commercial banks, and foreign commercial banks. These institutions are subject to the Bangladesh Bank's regulations and guidelines. Overall, Bangladesh Bank plays a crucial role in regulating and supervising commercial banks and financial institutions in Bangladesh to guarantee the stability and integrity of the banking sector (Bangladesh Bank).

2.4 Growth of Mobile Financial Services in Bangladesh

At present, 19 banks have been granted permission to offer mobile financial services (MFS), of which 13 have already initiated their offerings. Leading the market is bKash, a private limited entity, which is a subsidiary of BRAC Bank, a notable commercial banking institution. This bank, part of the BRAC group, retains a majority ownership of bKash, holding 51% of its shares.

Table 01: List of banks and their mobile banking products

Sl No.	Name of the MFS Service	Name of the Business Entity
1	ROCKET	Dutch Bangla Bank Ltd.
2	bKash	bKash Ltd.
3	MYCash	Mercantile Bank Ltd.
4	Islami Bank mCash	Islami Bank Bangladesh Ltd.
5	Trust Axiata pay: tap	Trust Axiata Digital Ltd.
6	FirstCash	First Security Islami Bank Ltd.
7	Upay	UCB Fintech Company Ltd.
8	OK Wallet	One Bank Ltd.
9	Rupali Bank	Rupali Bank Ltd.
10	TeleCash	Southeast Bank Ltd.
11	Islamic Wallet	Al-Arafah Islami Bank Ltd.
12	Meghna Pay	Meghna Bank Ltd.
13	Nagad	Bangladesh Post office (with interim approval of BB)

Source: Bangladesh Bank

The growth is evident through the surge in the number of agents and a hike in the number of registered accounts. As per the data in Table 02, between 2014 and 2016, the agent count rose from 0.54 million to 0.7 million, representing a 32% increase. Concurrently, the clientele expanded from 25.15 million to 41.07 million, marking a substantial 63.33% growth rate.

Table 02: Summary of mobile financial services

Description	2014 (December)	2015 (December)	2016 (December)
No. of approved banks	28	28	19
No. of banks started to convey the services	19	18	17
No. of Agents	5,40,984	5,61,189	7,10,026
No. of registered clients in million	251.86	318.45	410.78
No. of active accounts in million	12.15	13.21	15.87
No. of total transaction	74,473,558	114,847,197	133,727,455

Source: Bangladesh Bank monthly mobile financial services (2014 to 2016)

Furthermore, transaction volumes via mobile financial services channels have experienced a significant uptick during the same time frame, witnessing about a 16.67% increase. In 2015, approximately 1.14 billion transactions were executed through MFS platforms, a number that escalated to 1.33 billion the following year. In addition to this, there was a modest growth in the number of operational MFS accounts nationwide, moving from 13.21 million in December 2015 to 15.87 million by the end of December 2016. Thus, it unequivocally mirrors the growing demand and acceptance of these services among the Bangladeshi populace, especially the vulnerable, unbanked, and underprivileged segments of the society.

2.5 Agriculture of Bangladesh

Agriculture is the main employment sector in Bangladesh, accounting for 14.2% of the country's GDP in 2017 and employing 42.7% of the population (FAO of the UN). The majority of Bangladesh's agricultural output consists of traditional subsistence cultivation. Nearly half of Bangladesh's population is employed in agriculture, and more than 70 percent of its land is devoted to agricultural production. Bangladesh's agricultural output includes rice, wheat, maize, legumes, fruits, vegetables, livestock, fish, seafood, and dairy products, among others (International Trade Administration, 2020).

2.6 Marginal Farmers of Bangladesh

Small-scale farmers in Bangladesh known as marginal farmers operate either on their own property (up to 1.49 acres) or on rented land. More than 76 percent of farmers in the nation are small and marginal farmers. Most farmers in Bangladesh are small and medium-scale farmers (98.45 percent), with few large-scale farmers. (Ahmed et al., 2015)

2.7 Service Design

Designing mobile financial services for marginal farmers in Bangladesh necessitates a thorough, user-centric approach to service design that is user-centric of the circumstances of the intended audience. This calls for a thorough comprehension of marginal farmers' everyday routines, spending patterns, obstacles, and technological expertise (Eaves et al., 2020). To identify certain financial demands, such as those for loans, savings accounts, insurance, and payment services, field research is essential. It's also critical to gauge how many farmers use mobile phones and have access to the internet. A holistic design process requires the participation of multiple stakeholders, such as government agencies, financial institutions, mobile network carriers, local communities, and experts in agriculture (Steinke

& et al., 2022). This cooperative strategy guarantees cooperation from the regulatory authorities, integration of different viewpoints, and direction. Developing user personas and journey maps to illustrate how farmers engage with the service is the fundamental component of service design. Given the disparities in literacy and technological proficiency among farmers, creating a user experience that is easy to use, intuitive, and accessible on entry-level mobile phones presents a considerable problem (Fabregas et al., 2022). Additionally, adding regional languages and culturally appropriate design cues, as well as offering voice commands or audio instructions, can improve usability for a larger variety of users. The introduction of educational initiatives aimed at teaching farmers about mobile technologies and financial management is equally crucial (Rahman et al., 2020). Another essential element is setting up a support network with local agents that can help with service utilization. Iterative design changes are made possible through the gathering of insightful input through pilot testing and prototyping with a group of farmers (Steinke & et al., 2022). This stage is essential to ensure that the service successfully satisfies the needs of the users.

Key factors to consider are the service's scalability and sustainability, which call for a viable business plan and possible alliances with nearby companies or non-profit organizations. Additionally, security and privacy must be prioritized, requiring strict adherence to data privacy laws and strong safeguards for users' financial information (Aldboush et al., 2023). Ongoing improvement requires constant monitoring and assessment of the service's effectiveness and effect on financial inclusion. Implementing data analytics facilitates well-informed enhancements. Ultimately, the service will continue to be relevant and successful in achieving its goals if it keeps lines of communication open for input from the farming community and adjusts in response to evolving demands.

2.8 Mobile Services in Bangladesh

Over the past ten years, Bangladesh's mobile services market has witnessed a considerable transition, particularly with the introduction of mobile financial services (MFS) and the growth of nationwide digital connection. Bangladesh's mobile services industry spans a number of industries, including banking, healthcare, agriculture, and more. This dynamic ecosystem is fueled by advancing technology, favorable regulatory environments, and rising customer demand.

Several significant companies dominate the Bangladeshi telecommunications market, notably Grameenphone, Robi Axiata, Banglalink, and Teletalk (GSMA, 2020). Beyond phone

conversations, these businesses offer a variety of services like data plans, SMS, mobile applications, and value-added services. Mobile phone adoption has significantly increased as a result of the proliferation of inexpensive smartphones and competitive pricing methods used by mobile network operators (MNOs). Further boosting the digital economy and giving a boost to mobile-based businesses are likely to be government initiatives to expand 4G services nationally and the planned implementation of 5G (BTRC, 2019). Mobile financial services (MFS) have made one of the most remarkable improvements in mobile services in the area of financial inclusion. MFS usage has increased dramatically in Bangladesh, with brands like bKash, Rocket, Nagad, and others becoming well-known (Moon, M. I. 2022). These platforms provide a wide range of services, including savings and loan options, bill payments, cellphone recharge, and money transfers. MFS's success in Bangladesh can be ascribed to its capacity to connect with the unbanked populace and provide them with a safe, quick, and practical way to conduct financial transactions. Mobile services have improved access to market prices, weather forecasts, and farming advice in the agricultural industry, notably helping the rural populace. Services like the Grameenphone and Banglalink Krishi Jigyasha Community Information Center (CIC) have been important in this regard (GSMA, 2019).

Despite these developments, there are still problems, such as a lack of digital literacy, infrastructure gaps in remote regions, transaction security issues, and regulatory barriers. Stakeholders, including the government, service providers, and development partners, must work together to address these issues. In Bangladesh, mobile services have expanded and become more diverse, having a big impact on things like financial inclusion, agriculture, and health, among other things. To maintain this growth trajectory and fully realize the potential of mobile services to contribute to Bangladesh's socioeconomic development, more has to be invested in infrastructure, regulatory improvements, and initiatives to close the digital divide.

2.9 Problems faced by marginal farmers

Due to the complexity frequently associated with new digital platforms, many clients may find their first experience with mobile financial services to be intimidating. Therefore, for financial service providers to ensure that customers can simply understand and utilize these services, a simple and intuitive onboarding process is essential. Another crucial factor is usability. Mobile financial applications must have a user-friendly design, removing any chance for difficult navigation, complicated user interfaces, or unclear instructions that could prevent effective use. Furthermore, it is crucial to have a thorough awareness of customer

preferences and wants. Service providers need to take a proactive approach to matching their offers to client expectations because any discrepancy between expected and delivered services might result in a loss of customers. It's also essential to maintain consistency across numerous platforms, including online interfaces and mobile apps. Customers want a consistent experience across all service channels, and any variation can cause annoyance and a negative impression of professionalism.

Additionally, the value of an intuitive design cannot be emphasized, particularly when it comes to the onboarding procedure. Convolved processes that do not provide immediate guidance are likely to discourage customers. The simplicity of accessing technical support is also significant. Being able to get help quickly and effectively is crucial because difficulties in asking for assistance or delayed responses can make problems worse for customers and erode their faith in the service provider.

Table-03: Problems from previous literature review

Usability	Dipu & Sultana (2021);
Lack of technical support	Saadullah, M. et al (2002)
Lack of customer understanding	Rutherford, S. (1998)
Inconsistency across platforms	Salam, M. A et al (2003)
Terms and conditions	Ahammed et al (2021)
Mobile app glitches and updates:	Nargis et al (2020)

In a same spirit, making terms and conditions clear and understandable increases customer confidence and comfort, mitigating the drawbacks of complicated, protracted documents. Financial institutions must streamline these procedures to avoid any consumer annoyance or feelings of insecurity connected to transactional delays since quick account transfers and dispute resolution processes are essential in retaining customer trust and happiness. The stability of the mobile applications themselves is another important factor that needs consideration. The confidence of customers can be seriously damaged by technological errors or issues that continue after updates. Assuring the application's dependability and quickly fixing any faults shows a dedication to providing excellent customer service.

Finally, maintaining client satisfaction depends greatly on customer support's responsiveness. Customers who experience lengthy wait times or have trouble getting through to support staff may become quite upset, which emphasizes the need for financial service providers to provide priority to effective, accessible, and timely customer support channels.

3 Research and Service Design Methods

In this research paper, qualitative study and thematic analysis will be performed. The chosen methods are easily implemented to this research to have better understanding of the process. By using these methods, better interactions can be facilitated with the targeted groups to uncover their pains and gains.

This research will be brought out by the following service design methods and tools:

3.1 Business Model Canvas

The business model canvas is a tool used by designers to map out the main players, activities, and resources of a company or product, as well as the value proposition for the target market, customer connections, the channels involved, and financial considerations. In addition to providing an overview, it also identifies prerequisites for providing the service. “A business model describes the rationale of how an organization creates, delivers, and captures value.” — Alexander Osterwalder, Co-creator of the Business Model Canvas. The BMC is a one-page visual chart that includes aspects that describe a company's value proposition, infrastructure, customers, and finances. This visual depiction facilitates the perception and comprehension of complicated business concepts, which is especially important when targeting marginal farmers who may have limited experience to formal business models.

The BMC ensures that all key components of a business are taken into account. It promotes businesses to analyze customers, value propositions, and operational issues holistically, avoiding any blind spots that may arise when these parts are considered separately.

As a result, the use of the Business Model Canvas as a tool in developing a business plan for offering mobile financial services to marginal farmers is strategic and deliberate. It not only coincides with the agriculture sector's dynamics and complexities, but it also promotes inclusion, adaptation, and long-term growth. It represents a unique way to developing corporate plans based on real-world complexities while maintaining a focus on clarity and comprehensiveness. It is a critical component in providing transformative financial services to marginal farmers, hence driving a wave of economic upliftment and financial inclusion in the sector. Access to financial resources has been transformed by the incorporation of mobile technology into financial services, especially for marginalized groups like small-scale farmers and agricultural cooperatives. Since traditional banking services have historically been unavailable in rural and peri-urban regions, this transition is especially relevant there. Financial institutions may provide vital services like savings, loans, insurance, and digital payments in a convenient and approachable way by launching a mobile financial services

platform.

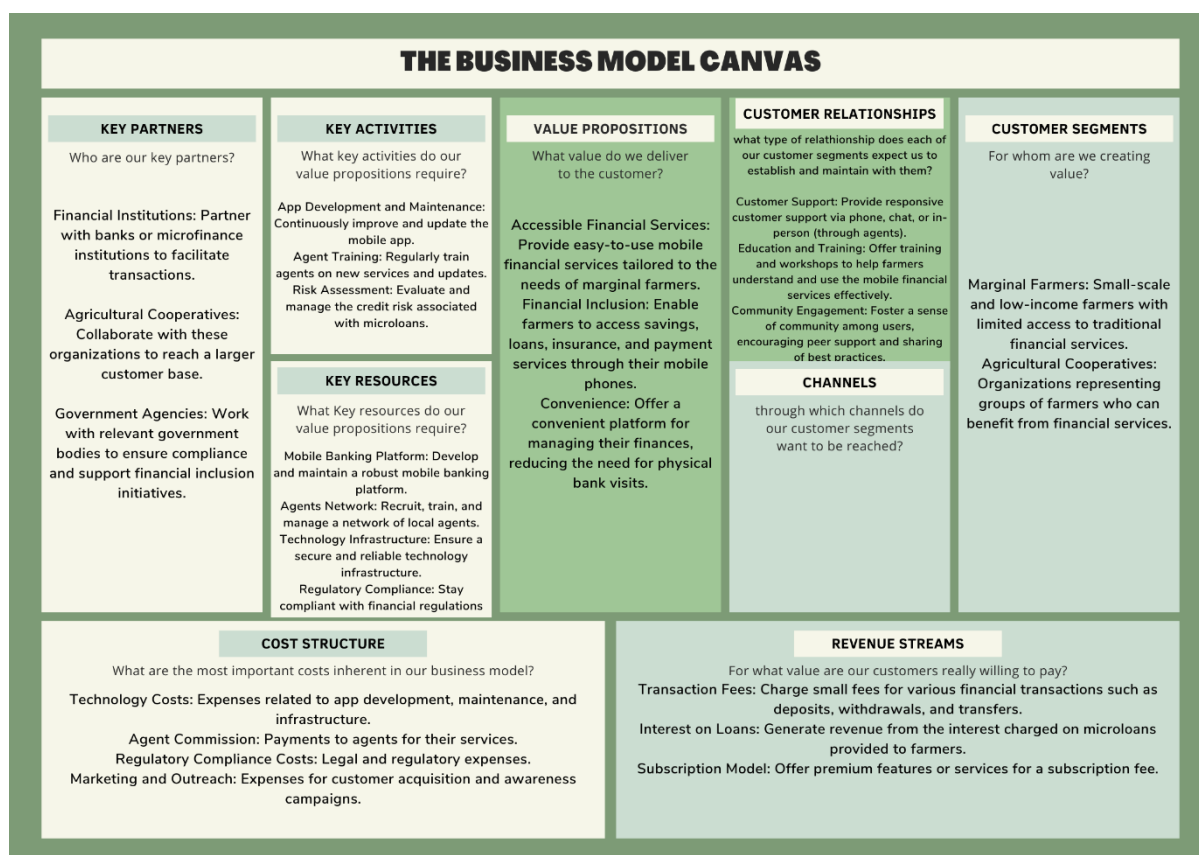


Figure 3: Business Model Canvas

This would help these underserved communities. The ability of mobile financial services to promote financial inclusion is one of their key value propositions. These platforms enable people to actively engage in the market, build credit histories, and successfully manage their finances by delivering formal financial services to neglected farmers. This is crucial for the economic stability and empowerment of some of the most disadvantaged communities; it is not just a matter of convenience.

It is impossible to overestimate the convenience that these platforms provide. They eliminate the need for time-consuming and frequently impractical travels to real bank offices by allowing farmers to conduct a variety of financial operations from the comfort of their homes or fields. This level of accessibility is made possible by both the availability of local agents in rural areas who assist user interaction with technology and by user-friendly mobile apps that are thoughtfully created to enable functionality even in locations with low network connectivity. These agents are essential in expanding the accessibility of financial services,

coupled with collaborations with regional community organizations and agricultural cooperatives. They take advantage of the connections and networks already in place within farming communities, acting as a crucial bridge between financial institutions and potential customers. Financial service providers must likewise invest in these areas through engagement, education, and training because these partnerships are not one-way. This mutually beneficial relationship stimulates adoption of the services, helps to establish trust, and fosters a feeling of community among users.

Transaction fees, interest on microloans, and maybe subscription fees for premium services are the main sources of income for these services. Significant investment is required in a number of essential resources, including the technology infrastructure itself, a network of local agents, and adherence to regulatory standards, in order to sustain these revenue streams. These services must be sustained and expanded, which requires ongoing app development, agent training, and risk assessment. Collaboration with already-existing governmental organizations, agricultural cooperatives, and financial institutions is crucial. Through these collaborations, transactions are facilitated, service offerings are improved, regulatory obligations are met, and financial inclusion programs are supported. These endeavors do incur costs, though. Technology, agent commissions, regulatory compliance, and marketing and outreach initiatives all require significant cash.

3.2 Service Blueprint

A service blueprint is a diagram that shows the connections between various service elements, including people, props (physical or digital evidence), and processes, that are directly connected to touchpoints in a particular customer journey. A service blueprint is related with a particular customer journey and the unique user goals included in that journey. The length of this voyage can change. As a result, if the same service can handle a variety of different scenarios, we might have many plans for it. Service blueprints should always be in line with a business objective, such as cutting down on duplication of effort, enhancing the employee experience, or unifying siloed processes.

The development of a service blueprint is deemed essential in the process of improving Mobile Financial Services (MFS) for marginal farmers in Bangladesh. This is because it facilitates the methodical visualization and comprehension of the service delivery. The

customer journey is captured in this design, which also outlines the actions the client takes, the tangible evidence they come across, and the support procedures that facilitate the provision of services.

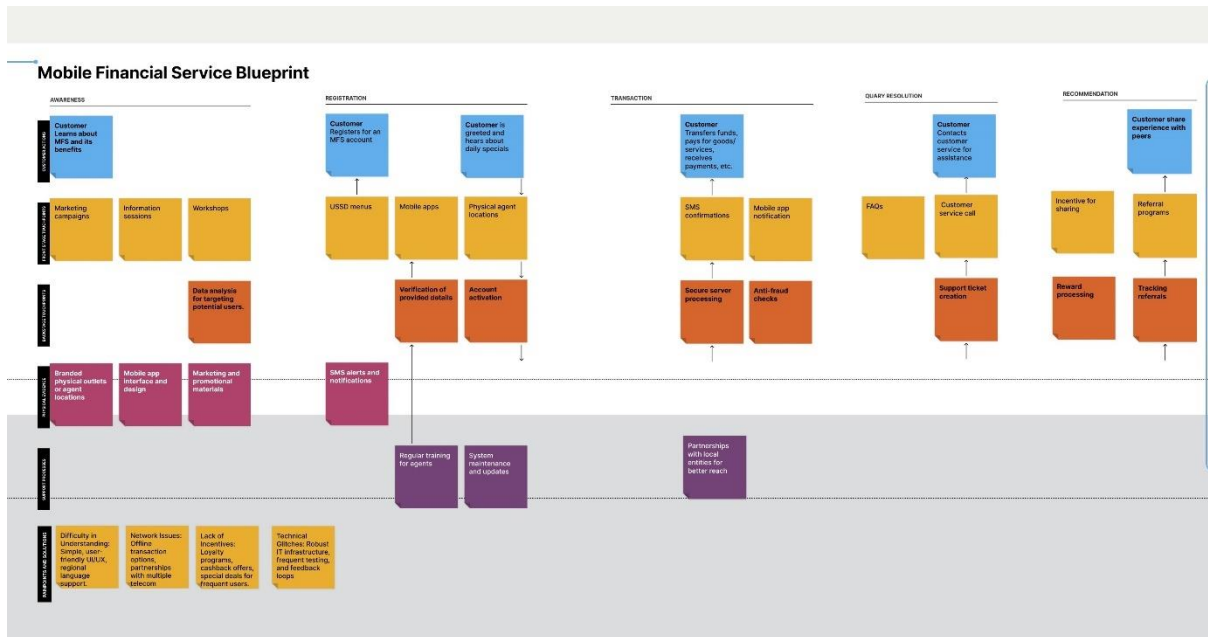


Figure 4: Service blueprint

The first step in the customer journey is awareness, when farmers are made aware of the idea and advantages of MFS through seminars, informational sessions, and focused marketing initiatives. In order to make the switch to registration, farmers must interact with friendly smartphone interfaces or physically visit agent locations, where their accounts will be activated and their details checked. The transaction phase, which guarantees consumers of safe fund transfers, bill payments, and payment receipts through fast confirmations via SMS or mobile applications, is the focal point of the MFS experience.

Customer service platforms, which range from call centers to cutting-edge chatbots and extensive FAQs, are essential to preserving service quality because they enable problem-solving and issue-remedial, generating a feedback loop that drives service enhancement. Beyond face-to-face interactions, the design recognizes the importance of referral systems that use farmers' social networks to encourage service adoption through rewards. The backstage processes are essential yet invisible to the customer. These include secure server transactions, stringent anti-fraud procedures, data analytics for consumer segmentation, and careful system maintenance. Constant agent training and partnerships with neighborhood

organizations to broaden service coverage and customize offers to farmers' specific need support the MFS infrastructure.

This well planned service encounter is not without difficulties. Strategic solutions are required for acknowledged pain points such convoluted user interfaces, unreliability of networks, technical malfunctions, and a lack of user incentives. These consist of creating user-friendly interfaces in local languages, forming several telecom alliances to support network reliability, and including loyalty programs to improve user interaction.

Overall, the service blueprint represents more than just an operational strategy; it also represents a dedication to a continuous communication between customers and service providers, which is essential for the ongoing improvement and modification of Mobile Financial Services to meet the changing demands of Bangladesh's marginal farmers.

3.3 Customer journey maps

A customer's path through a product or service is represented graphically in a customer journey map. By emphasizing the different touchpoints, feelings, and pain points customers face along the process, it helps to comprehend the customer's experience from their perspective.

In the early "Awareness" stage, when marginal farmers learn about mobile financial services, they may be skeptical due to their lack of knowledge with digital platforms. Uncertainty reigns supreme, fueled by queries like "What is this?" and probable mistrust in the new system. Their attention grows as they progress to the "Consideration" stage. Apprehension, on the other hand, sets in. Farmers are concerned about the system's complexity, potential security issues, and associated service costs. These fears function as roadblocks, stopping them from quickly accepting the service. When they begin the "Onboarding" process, their excitement is often dampened by real-world hurdles such as technical issues in setting up the app or comprehending its functionalities. This phase also highlights the difficulties of completing documentation requirements, particularly if they lack relevant documents or find them difficult to get.



Figure 5: Customers journey map for a marginal farmer

The “Exploration” stage should ideally be a time of discovery, but for many people, it becomes a time of perplexity. Marginal farmers, who are generally unfamiliar with digital interfaces, may have difficulty utilizing the program. Furthermore, financial words that are new or complex can be confusing. Farmers are hoping for a smooth transition from “Regular Use”. This stage, however, is hampered by challenges such as internet issues, transaction delays, and the unanticipated sting of hidden charges. These annoyances have the potential to destroy the faith they've begun to have in the system. Even when they go to the “Advocacy” stage, where they could potentially become service ambassadors, there is resistance. Some farmers may believe there aren't enough incentives to refer others, and some societal conventions may prevent them from sharing their experiences.

Finally, in the “service & Feedback” phase, their problems are exacerbated by delayed customer service response times or the feeling of being in the dark about app upgrades. When problems develop, which they undoubtedly do, the lack of prompt and efficient resolutions can aggravate their annoyance.

3.4 Interview with Farmers and MFS Officials

Conducting interviews with marginal farmers and MFS officials is considered an important aspect of the study, as it has the potential to provide valuable insights, opinions, and information from relevant parties. This can greatly contribute to the quality and depth of research. These interviews serve as an efficient method for collecting quantitative as well as qualitative data from the participants. Such data can assist in validating research hypotheses, understanding the perspectives of different stakeholders, and assessing the effectiveness of existing programs or policies. Interviews also have the advantage of providing a level of anonymity for respondents, which may encourage more honest and accurate responses. This is particularly important when discussing sensitive topics or soliciting feedback on controversial issues.

A Comprehensive Report on Mobile Financial Services (MFS) and Financial Inclusion of Bangladeshi Marginal Farmers.

Executive Synopsis:

With the introduction of Mobile Financial Services (MFS), a significant shift in Bangladesh's financial inclusion landscape has been seen. This study seeks to comprehend marginal farmers' experiences as well as MFS officials' perspectives on this revolutionary trend.

Background:

Bangladesh has a significant population of marginal farmers with limited access to formal financial services. Mobile Financial Services have emerged as a potential solution to bridge this gap. During the interviews, 15 marginal farmers and 5 MFS officials and 3 MFS agents participated with the 22 and 9 sets of questions respectively. Please see the annexure 1 & 2. Some of the participants from marginal farmers group were from Feni, and most were from Mymensingh, the southern part of Bangladesh. Meanwhile mobile financial officials were from Dhaka, Feni, and Mymensingh District of Bangladesh. All the participants communicated through social media apps such as WhatsApp and Messenger etc. The five MFS officials were from the Islamic Wallet section of Al-Arafah Islami Bank Ltd., Bikash officials. The interviews were taken from the beginning of July 2023 to the end of August 2023. The interview language

was Bengali while most of the farmers were using their own local language, and some language was interpreted by local person of their community.

Methodology:

A mixed-method technique was employed to collect both qualitative and quantitative data. A systematic questionnaire was given to marginal farmers, while MFS employees were asked open-ended questions to gain their views.

Marginal Farmers' Key Findings

Usage Pattern: A substantial number of farmers have adopted MFS for varied periods of time. The majority of these services were discovered through human contacts, underlining the importance of community in technology adoption. Farmers mostly utilize MFS for agricultural payments (receiving produce and paying for inputs), followed by personal remittances, savings, and loan access. Technical malfunctions, scam, unclear service prices, security concerns, and network issues were among the common issues faced.

Positive Impact: Despite the difficulties, several farmers recounted situations in which MFS facilitated their farming efforts, provided new business prospects, or provided assistance during financial hardships.

MFS Officials' Opinions:

According to all officials, MFS has democratized finance and reduced farmers' reliance on middlemen and loan sharks. According to most of them, MFS is viewed as the future of rural finance in Bangladesh, with a need for ongoing adaptation to meet the changing demands of the farming community. Government and non-governmental organizations (NGOs) were urged to play roles such as regulatory assistance, enabling connectivity in distant locations, introducing digital literacy initiatives, and conducting grassroots campaigns. Some also believe that, technological skepticism, inadequate literacy, mistrust in digital services, and network concerns are key impediments to adoption.

The officials advocated AI-based financial advisors, marketplace integration, real-time market price advisories, and increased network connectivity. Mobile Financial Services, while not without obstacles, are causing a paradigm shift in the financial behavior of Bangladesh's

marginal farmers. Collaborative efforts from the government, non-governmental organizations, and service providers can accelerate this transformation, bringing a larger share of the farming population into formal financial institutions.

Results of Mobile Financial Services (MFS) Usage Among Bangladeshi Marginal Farmers and Insights from MFS Officials

Demographics: Several significant trends emerge from the age distribution statistics presented in the agricultural sector. Notably, the number of young farmers (18-25 years) is very low, indicating potential obstacles in drawing the next generation to farming. Individuals aged 26-35 make up the largest segment, representing the agricultural core workforce. Furthermore, mid-career farmers (36-45) and experienced farmers (46-55) account for 25% of the population, while elderly farmers (56 and older) account for 10%.

Table-04: Demographics

Demographics	Percentage
18-25	10%
26-35	30%
36-45	25%
46-55	25%
56 and up	10%

These demographics have consequences for agriculture, such as the requirement for succession planning to transfer expertise and assets, addressing the aging workforce, supporting innovation and training, and maintaining a balanced age distribution for sector sustainability. Overall, these findings highlight the need of specialized measures in ensuring the agricultural sector's long-term health and prosperity.

Gender Proportion:

In Bangladesh's marginal agricultural population, there is a significant gender discrepancy in mobile financial service usage, with 85% of customers being male and only 15% female. There were no responders who identified outside of the standard gender binary. This disparity may

be the result of long-standing socio-cultural practices in agrarian countries where money transactions are overwhelmingly male-oriented. Despite their substantial contributions to agriculture, women may suffer constraints as a result of societal standards or technology access hurdles. The absence of representation from the "Other" gender category highlights the importance of inclusion in outreach attempts. Addressing the gender gap is critical to ensuring that all farmers receive equitable benefits from mobile financial services.

Table-05: Gender propotion

Gender	Percentage
Male	85%
Female	15%
Not want to mention	0%

Academic Background:

The educational backgrounds of marginal farmers in Bangladesh vary, with 15% having no formal education, 45% completing primary schooling, 35% reaching secondary education, and a mere 5% achieving higher education. This distribution highlights a significant number with basic educational backgrounds, though many lack advanced academic exposure.

Table-06: Academic background

Educational background	Percentage
No formal education	10%
Primary education	45%
Secondary education	35%
Higher education	5%

The limited reach of higher education might be due to various barriers, including financial constraints or socio-cultural factors. Understanding these educational trends is crucial for devising strategies tailored to the unique needs and potential of this community within Bangladesh's evolving agricultural sector.

MFS Experience:

Mobile Financial Services (MFS) are widely used among Bangladesh's marginal farmers, with 80% using them. MFS usage length varies, indicating varying levels of trust and integration into financial activities.

Table-07: MFS Experience

Usage	Percentage
Atleast once	80%
Less than 6 months	25%
6 months to a year	20%
1 to 2 years	30%
More than 2 years	25%

While some farmers have only recently begun utilizing MFS, others have been using it for more than two years. This broad involvement highlights the necessity of recognizing the distinct problems and possibilities farmers face at different stages of their MFS experience in order to ensure long-term adoption and optimize benefits.

Primary activities:

Mobile Financial Services (MFS) play an important part in the financial behaviors of Bangladesh's marginal farmers. Most farmers utilize MFS to get agricultural payments and purchase necessary inputs, emphasizing its significance in their primary vocation. Furthermore, MFS is becoming more popular for personal financial needs such as remittances and savings.

Table-08: Primary activities

Primary activities	Percentage
Getting paid for agricultural products	60%
Making agricultural input payments	50%
Remittances from individuals or families	40%
Money saved	25%
Credit or loan access	20%
insurance services	5%

A rising segment is also using these services to obtain credit or loans, showing the platform's growing involvement in the financial industry. However, the application of MFS for insurance purposes is still limited. Overall, while agricultural transactions predominate, the diverse use of MFS demonstrates its broad significance on these farmers' economic landscape.

Difficulties encountered:

Adoption of Mobile Financial Services (MFS) among Bangladesh's marginal farmers reveals a series of hurdles that temper its seamless integration into their daily financial operations. A key barrier is the frequent contact with technological problems by the vast majority of consumers. Such flaws not only impede transactions, but they may also undermine users' trust in digital services.

Table 09: Difficulties encountered

Usage	Percentage
Technical issues	65%
Uncertain or excessive service charges	50%
Security concerns	40%
Usability concerns (language hurdles, complex interfaces)	55%
Reported difficulty in resolving problems	30%
Network Problems	70%

There is a palpable worry about the clarity and amount of service prices. Half of those polled face uncertainties or impressions of excessive fees, indicating a potential communication breakdown or a true need for a more equitable charge system. Such concerns highlight the significance of financial openness and fairness, especially when dealing with underprivileged communities. Furthermore, a considerable portion of users are concerned about security. With two-fifths of respondents questioning MFS's security robustness, it becomes critical to

strengthen security procedures and, perhaps more significantly, educate consumers about the steps done in this direction.

Usability issues, such as language barriers and complex interfaces, indicate that, while the technological infrastructure for MFS is in place, there is still opportunity for improvement in making these platforms more intuitive and culturally responsive. Design cues adapted to the local linguistic and cultural context can help bridge the gap and make MFS more user-friendly. The handling of grievances is an important component of the MFS experience. While just a small percentage of customers experienced difficulties in this area, the importance of effective and timely conflict resolution cannot be emphasized. Such interactions shape user trust and may decide the platforms' long-term success.

Finally, the predominance of network connectivity issues, which the vast majority of people have experienced, offers a clear picture of the infrastructural concerns. Reliable connectivity is the backbone of digital financial platforms, and its inconsistency may discourage customers from relying on these services on a regular basis.

Favorable experiences:

Mobile Financial Services (MFS) has significantly impacted the agricultural and economic landscape for marginal farmers in Bangladesh. A large portion of these farmers credit MFS with enhancing their farming processes and revealing new entrepreneurial prospects.

Table 10: Favorable experiences

Favorable experiences	Percentage
Beneficial in facilitating farming	60%
New business possibilities or collaborations	20%
Aided in overcoming financial difficulties	45%

Additionally, MFS has served as a crucial financial safety net during challenging times. Despite existing challenges in its implementation, MFS's positive influence on facilitating agriculture,

spurring business growth, and providing economic stability underlines its transformative potential for these farmers.

Perspectives from MFS Officials:

MFS as a game changer for financial inclusion, decreasing the role of middlemen and providing direct financial access. Officials agree that MFS is critical for rural finance, and that it must evolve in order to suit farmers' requirements. They focused on regulatory support, connection initiatives, digital literacy programs, and grassroots campaigns to increase adoption.

Barriers:

Several hurdles to the adoption of Mobile Financial Services (MFS) among Bangladesh's marginal farmers highlight the complexities of digital adoption in this demography. A sizable majority of respondents exhibit technological pessimism, implying deep-seated fears or even previous negative encounters with digital instruments. This opinion is reinforced by the fact that an equal amount of users identify a lack of digital literacy as a barrier, demonstrating a gap in core knowledge and abilities required to access these services. Another major problem is mistrust in digital services, with more than half of respondents expressing doubt. This mistrust could be a result of previous poor experiences, rumour, or a general apprehension of unfamiliar platforms, stressing the importance of developing trust and confidence in digital ecosystems.

Table 11: Barriers

Barriers	Percentage
Technological pessimism	80%
No digital literacy	80%
Mistrust in digital services	60%
Connectivity concerns	90%

However, arguably the most significant issue highlighted by the data is the widespread anxiety about connectivity. The vast majority of responders refer to connectivity concerns,

emphasizing the infrastructural impediments that impede MFS deployment. Reliable and constant connectivity is essential for any digital service, and its absence can significantly damage MFS's effectiveness and reliability for these farmers.

Suggested enhancements:

The insights gleaned from marginal farmers' reactions in Bangladesh provide a road map for future refinement and adaptation of Mobile Financial Services (MFS). Among the several recommendations, adding AI-based financial advisors has gained steam, with a significant portion of respondents asking for such a feature. This demonstrates an increased user expectation for sophisticated digital tools that may provide tailored financial advice. Simultaneously, the desire for integrated marketplace features highlights these farmers' desire to consolidate diverse aspects of their economic activity onto a single digital platform. Such integration could result in more efficient transactions, more diverse services, and potentially better economic consequences for users. Furthermore, the preference for real-time market price alerts reflects the agriculture sector's dynamic nature and the requirement for timely information. Given the volatility of agricultural produce pricing, access to real-time data could provide farmers with the information they need to make informed decisions, thus protecting them from bad market conditions.

Table 12: Suggested enhancements

Suggested enhancements	Percentage
AI-based financial advisors	20%
Integrated marketplace features	20%
Real-time market price alerts	40%
Improved network connectivity	100%

However, the consensus desire for greater network connectivity towers over all of these proposals. The emphasis on this characteristic emphasizes its fundamental relevance. Even the most powerful features would be rendered ineffectual without continuous and dependable connectivity. This common emotion acts as a rallying cry for infrastructure expenditures to ensure MFS's smooth operation.

In conclusion, while Bangladesh's marginal farmers are open to advanced and integrated features inside MFS, the core of their digital experience, connectivity, requires immediate attention. Addressing these concerns and goals will be critical in the future development of a more inclusive, effective, and user-centric MFS environment. In conclusion, while marginal farmers have found MFS to be quite useful, there are obvious hurdles in the form of technological faults, connectivity issues, and usability concerns. The officials underline MFS's revolutionary potential, emphasizing the importance of technological education, infrastructure upgrades, and continued innovation in order to increase financial inclusion in Bangladesh.

Persona 1:

Abdul Rahman, a 34-year-old marginal farmer from northern Bangladesh, is at the crossroads of traditional agriculture and the expanding world of digital banking. Abdul's 1.5-year journey into the realm of Mobile Financial Services (MFS) began with an elementary education and a passion to rice and vegetable growing on ancestral land.

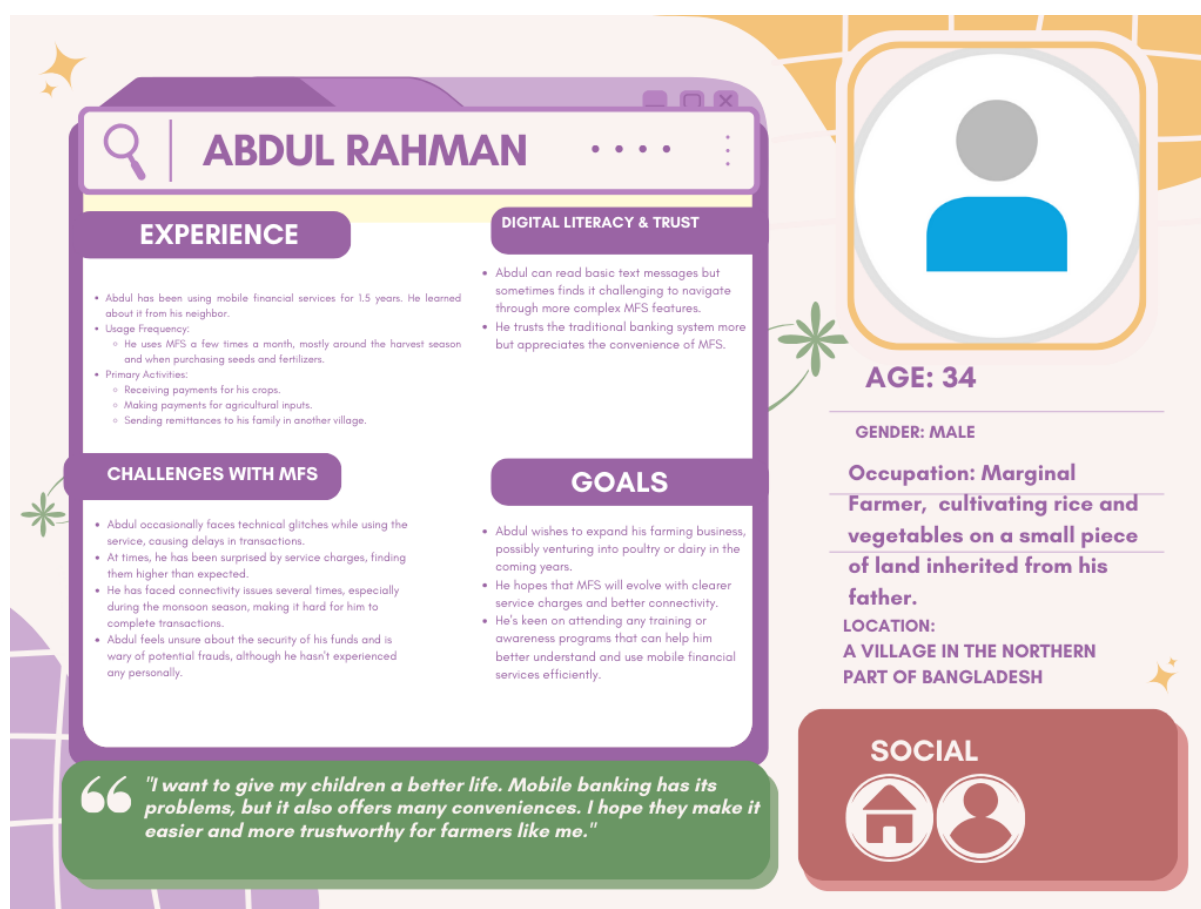


Figure 6: Persona 1 of a marginal farmers

This move, inspired by a neighbor, finds him predominantly using MFS during crucial agricultural cycles, such as harvests, receiving payments, purchasing agricultural necessities, and remitting funds to distant families.

Persona 2:

Salma Begum, a widow of 42 years who lives in a small village in southern Bangladesh, is a perfect example of the potential and difficulties marginal farmers—especially women—face when utilizing mobile financial services (MFS). Salma's life is an example of the adaptability and tenacity of Bangladeshi rural women, as she balances her responsibilities as a farmer and a local handcraft artist. Her experience with MFS, spurred on by her older son's support and local seminars, exemplifies the slow but significant infiltration of technology into rural life. Salma's engagement with MFS highlights the increasing significance of financial technology in rural economies. This is mainly because she needs to handle payments for her farming supplies and handicrafts as well as transfer money to her family. Her experience illustrates the notable, if difficult, transition from conventional banking procedures to a more digital strategy. Salma frequently struggles to understand transaction fees and use the sophisticated MFS interface due to her inadequate literacy and technical skills. This highlights a larger problem with rural communities' lack of access to technology.

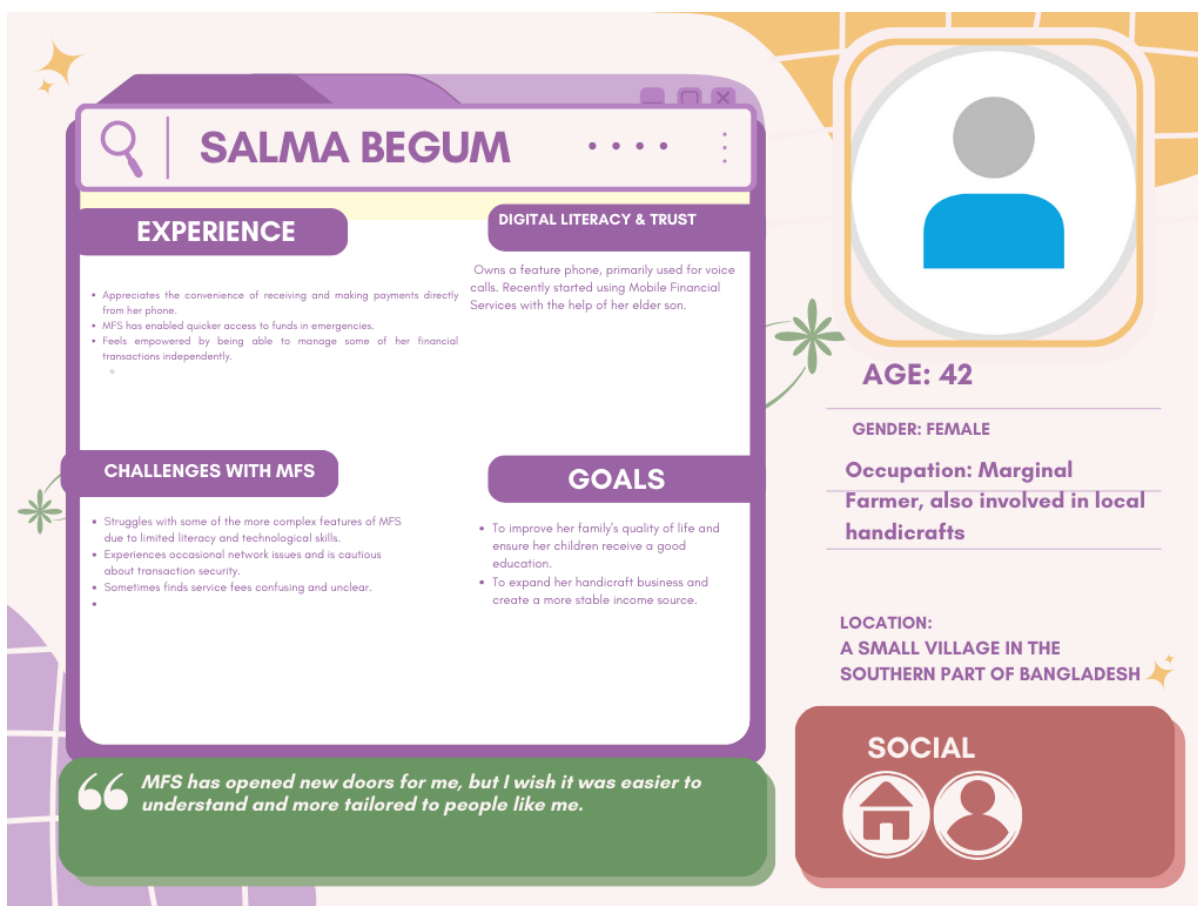


Figure 7: Persona 2 of a marginal farmers

Salma has had generally good experience with MFS in spite of these difficulties. In addition to saving her time, the ease of conducting business straight from her phone has given her a sense of financial independence. MFS has been an invaluable tool, especially during emergencies, giving her fast access to money. For women like Salma, who have limited access to regular financial systems, this feature of MFS is extremely empowering. Her narrative explores the potential of technology to uplift underprivileged groups, particularly women, in addition to the use of said technology.

Salma is involved with more community organizations and projects than just her own MFS use. She contributes significantly to the spread of MFS by frequently sharing her experiences and expertise with other women in her area. Her goals to raise her family's standard of living and pursue new business ventures are representative of marginal farmers' larger hopes for growth and stability in their economy. Salma's persona offers insightful information for the development and application of financial services because of its distinct combination of hardships and victories. It draws attention to the need for more approachable, safe, and user-friendly MFS solutions that serve both tech-savvy people and those with less financial and

computer competence. Her insights and criticism are crucial in creating a more diverse financial ecosystem that recognizes and caters to the many demands of Bangladesh's marginal agricultural communities.

3.5 Benchmarking

Benchmarking is a crucial aspect of a thesis on financial inclusion in Bangladesh through mobile financial services. It allows to compare the performance of mobile financial services in Bangladesh with other similar markets, best practices, or established standards. A contextual understanding of the performance and progress of mobile financial services in Bangladesh can be offered by benchmarking. By comparing it with other countries or regions, unique strengths and weaknesses in the Bangladeshi market can be identified, as well as potential areas for improvement. Examining the performance of mobile financial services in Bangladesh in relation to other markets can reveal innovative approaches or technologies that have successfully promoted financial inclusion elsewhere. This may inspire new ideas or initiatives that could be adapted and implemented in the Bangladeshi context. Accurate measurement of the aspects of financial inclusion in the agriculture sector can be achieved through the selection of key performance indicators. Conducting case studies of successful mobile financial service providers in Bangladesh will offer insights into the approaches and strategies that have been effective in comprehending the pains and gains of farmers.

When it comes to mobile financial services (MFS), benchmarking research is a vital instrument for assessing how well financial inclusion plans work for the agriculture industry. The financial inclusion of the agricultural sector in Bangladesh through MFS makes a strong case for this kind of study, especially when compared to the innovative M-Pesa initiatives in Kenya and the integrative methods in India.

Kenya has become the leader in MFS, partly because of M-Pesa, which has become extremely popular and is characterized by both high user trust and deep market penetration. In particular, the M-Pesa user experience's simplicity is commendable and serves as a model for Bangladesh to follow. In sharp contrast to the relative scarcity of similar networks in Bangladesh, the dense network of M-Pesa agents in this case assures accessibility for rural farmers, which is a crucial factor (MC Parlasca et al, 2022). Bangladesh might be able to

emulate Kenya's achievements by strengthening its agent framework, particularly in remote agricultural areas.

Moreover, MFS's integration into Kenya's agricultural value chain has been flawless, and its range of services includes microinsurance for crops in addition to payments for agricultural inputs. Bangladesh's MFS ecosystem might take inspiration from this degree of integration, especially in terms of establishing collaborations between MFS providers and agricultural players, which would improve the sector's financial flexibility.

Looking now to India, the MFS environment there is distinguished by a direct interaction with digital infrastructures of the government and the availability of financial solutions designed with farmers' requirements in mind. This is demonstrated by MFS's integration with the Aadhaar biometric database, which streamlines the identification verification process (J Jose et al, 2023). If Bangladesh were to adopt a similar strategy and integrate MFS with its National identification (NID) system, this may be beneficial. Notable are also the customized financial solutions offered to Indian farmers, including loans, direct subsidies paid out through MFS accounts, and crop insurance. These products offer a customized approach to financial inclusion that Bangladesh could take into consideration in its efforts to improve the services it provides to the farming population.

Furthermore, it is impossible to exaggerate the importance of digital literacy in India. The implementation of educational programs designed to increase digital financial literacy has resulted in higher rates of MFS adoption among rural communities. This suggests that Bangladesh should prioritize improving the digital competency of its farmers in order to foster greater involvement with MFS. When comparing Bangladesh's MFS advancements to those of Kenya and India, several KPIs become evident as crucial.

First, comparing adoption rate, Bangladesh should try to catch up to Kenya by emphasizing accessibility and transactional convenience. Adoption rate measures the percentage of farmers using MFS. Kenya now leads in this regard. Second, transaction costs are an important indicator. Kenya's M-Pesa has competitive prices that encourage adoption; should Bangladesh decide to reduce its fees, this might provide it a competitive advantage. Third, having a wide range of services is crucial. The addition of loans, insurance, and agricultural subsidies to India's MFS portfolio shows Bangladesh how to expand its service offering.

Fourth, MFS infrastructure in Kenya is resilient and provides continuous service, something Bangladesh should imitate to assure reliable availability, especially during the busiest agricultural seasons. Finally, as stressed in Kenya and India, financial knowledge and training are essential. Bangladesh might potentially learn from this by improving farmer education regarding MFS utilization, which could result in increased acceptance and more efficient application.

Overall, even though Bangladesh has made progress in providing MFS to its marginal farmers, there is still room for improvement based on what Kenya and India have learned. It is possible that Bangladesh's MFS offerings could reach a new level of effectiveness and inclusivity in the agricultural sector if it adopts the best practices from these countries, which include strengthening financial literacy, streamlining the user experience, growing agent networks, and integrating MFS with agricultural processes.

Table 13: MFS comparison with Kenya and India

	Bangladesh	Kenya	India
Infrastructure	The MFS infrastructure is rapidly expanding, with a focus on increasing the number of agents and service points. However, coverage, particularly in remote rural areas, can be inconsistent	M-Pesa has a robust infrastructure, with a vast network of agents permeating rural areas, enabling widespread access for agricultural users.	The infrastructure is supported by the Aadhaar-enabled Payment System (AePS), which links biometric identification with MFS, ensuring secure and accessible financial services even in remote locations.
Regulatory Environment	The Bangladesh Bank has been proactive in regulating MFS, although the regulatory framework can sometimes slow innovation and adaptation to rural needs.	The success of M-Pesa was partly due to a flexible regulatory approach that allowed for rapid growth and innovation in MFS.	The regulatory environment is stringent, but it has been conducive to integrating MFS with other government services, thereby creating a holistic ecosystem.

Service Adoption	Adoption is growing among marginal farmers, but there are still significant segments of the rural population that are underserved by MFS.	M-Pesa boasts a high adoption rate across the population, including among farmers, due to its ease of use and trust built over the years.	There is a considerable rate of adoption, facilitated by the government's push to digitize financial services and the direct linkage of MFS to subsidy distributions and other financial products.
Range of Services Offered	The services are primarily focused on basic financial transactions such as money transfers, bill payments, and savings. There's room to grow in terms of offering more tailored financial products for the agricultural sector.	M-Pesa offers a wide range of services that cater to agricultural needs, including payments for supplies, produce, savings, credit, and insurance products.	The range of services is extensive, with specialized financial products for the agricultural sector, such as loans, insurance, and subsidies directly transferred to farmers' MFS accounts.
Integration with Agricultural Services	The integration of MFS with agricultural services is an area that is developing, with potential for more cohesive linkages between financial and agricultural services.	M-Pesa is deeply integrated into the agricultural value chain, allowing for seamless transactions related to agricultural activities.	The government's digital infrastructure allows for an integrated approach where MFS is part of a broader ecosystem that includes agricultural subsidies, insurance, and market information.

3.6 Business Ecology Mapping Methods

Business ecology mapping is a method used to analyze and understand the complex relationships and interdependencies among businesses, the environment, and society. System mapping, stakeholder analysis and social network analysis methods we can use for business ecology mapping. In Bangladesh's financial inclusion environment, marginal farmers constitute a segment with distinct requirements and concerns. With low income and

historically limited access to traditional financial services, they continue to be a major beneficiary of innovative mobile financial solutions.

Mobile Financial Service Providers are playing an important role as technology advances the banking sector into the digital age. These service providers have designed their platforms to make services not just accessible but also affordable. However, their success is entwined with hurdles, ranging from building a robust technological infrastructure to navigating regulatory waters. Traditional banks and financial organizations, despite their historical dominance, are discovering the need to modernize. Their roles are changing, with some seeing them as collaborators with tech-driven solutions and others seeing them as rivals.

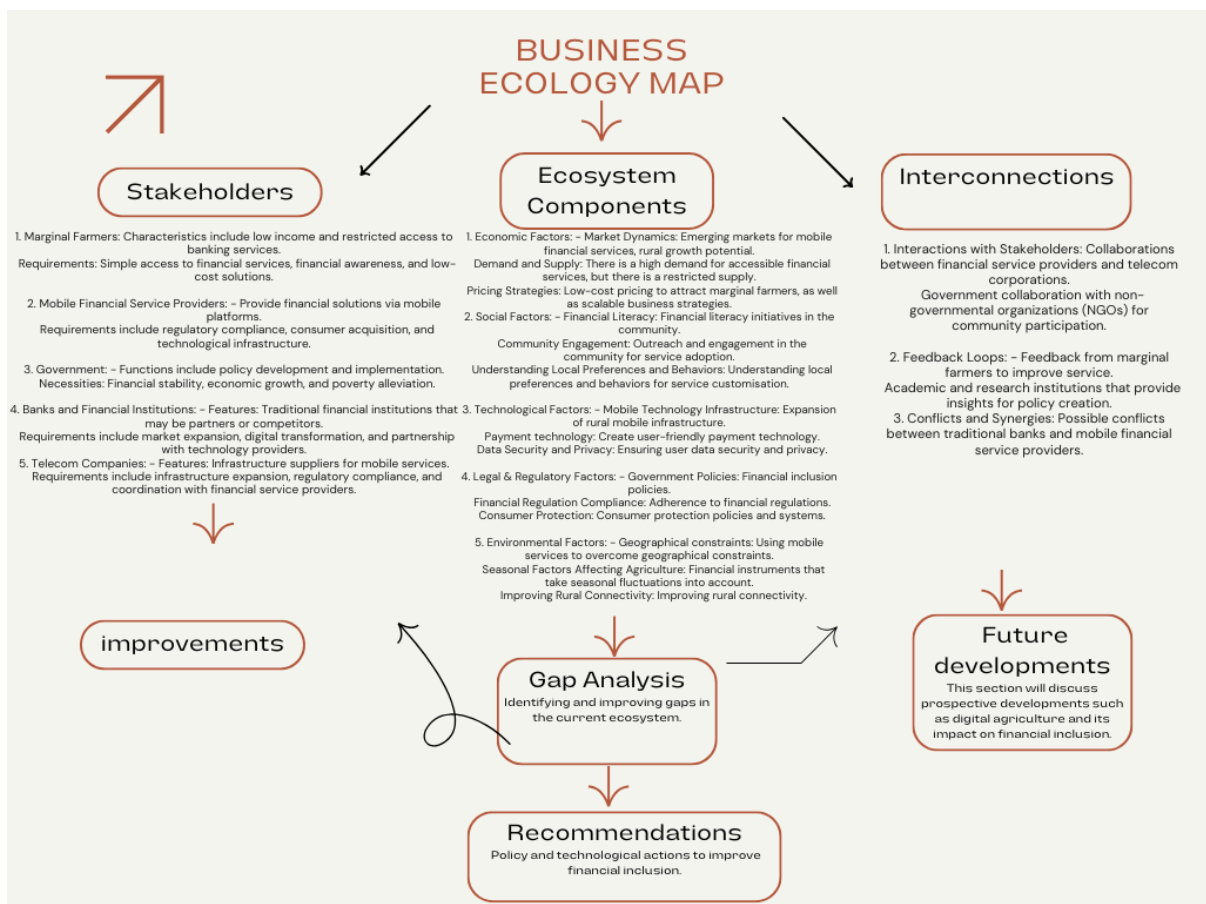


Figure 8: Business ecology mapping

The position of the government is critical. On the one hand, it advocates for laws that promote financial inclusion, with the goal of empowering even the most remote farmer. On the other hand, it continues to be the regulatory gatekeeper, ensuring that financial and technical breakthroughs do not undermine the greater economic framework or jeopardize

individual rights. Telecommunications corporations have emerged as unexpected but crucial friends on this trip. Their infrastructure serves as the foundation for mobile financial solutions. What is their goal? Increasing their reach and assuring connectivity even in the most distant areas of Bangladesh. However, this is more than just an economic or technological venture. Bangladesh's social fabric is extremely important. Financial knowledge, community trust, and an awareness of local behaviors are just as important as the technologies that enable these services. Of course, there are difficulties. The journey to real financial inclusion is complicated, with geographical hurdles, seasonally variable agricultural revenues, and varying degrees of digital literacy across areas.

Despite these difficulties, there are stories of triumph. There is the story of the marginal farmer, who was once reliant on loan sharks but now has access to fair finance through his mobile phone. Alternatively, the narrative of service providers innovating to fulfill specific local needs. Understanding this dense network of linkages, obstacles, and possibilities is critical for charting the path forward. Research, real-world insights, and feedback-driven continual evolution will be critical. As technology and agriculture merge in unexpected ways, the goal remains consistent: ensuring that every marginal farmer in Bangladesh has access to the financial tools they require to prosper.

4 Result and Conclusion

The study emphasizes how MFS can significantly improve the lives of marginal farmers in Bangladesh. Although there are obstacles to overcome, there are an abundance of potential advantages. There is a clear chance to get closer to a more strong, inclusive, and efficient agricultural financial ecosystem by applying lessons learned from international best practices to Bangladesh's particular situation. In addition to providing marginal farmers with financial support, this will advance Bangladesh's larger objectives of reducing poverty, ensuring food security, and fostering economic growth.

The study makes various theoretical contributions, presents a number of managerial implications, and identifies topics that warrant further investigation and study in the context of mobile financial services (MFS) in Bangladesh.

4.1 Key Findings

The study carried out on the implementation and utilisation of MFS in Bangladesh offers a comprehensive understanding of the financial practises and requirements of marginal farmers in the nation. It reveals that MFS has significantly improved this group's financial inclusion by providing them with an option to conventional banking practises that were previously unavailable or inappropriate. These farmers may now conduct financial transactions directly thanks to MFS, which lessens their need on middlemen who frequently take a cut of their already meagre income.

This study clarifies the critical function that community networks play in encouraging MFS adoption. It is through these networks that knowledge about the functions and advantages of MFS has spread widely. Farmers who were initially hesitant to embrace the digital shift have been greatly encouraged by the deep-rooted trust in these community ties. The path to complete adoption is not without difficulties, though. The use of MFS platforms has been found to be a considerable hurdle, especially for users with minimal literacy. This indicates that to guarantee that MFS may be more widely adopted, there is an urgent need to build interfaces that are user-friendly and sensitive to local languages. The survey also emphasizes the farmers' concerns about the strength of the security measures in place to safeguard their financial activities and the openness of service charge transparency. To maintain the use of MFS and further incorporate it into the farmers' financial practices, these issues must be resolved.

Additionally, the complex interactions between different stakeholders are highlighted. Governmental agencies, conventional financial institutions, and service providers all play different roles in determining how MFS develops. It is the responsibility of service providers to improve user experience and strengthen platform security. To increase their reach, financial institutions might be able to collaborate with digital platforms. Meanwhile, it is the duty of the government to establish a regulatory framework that strikes a balance between encouraging innovation and safeguarding consumers. By examining how the farmers make decisions, the study adds to the larger conversations in behavioral economics, especially when it comes to how the availability of new technical solutions affects economic decisions. Furthermore, the study adds to our understanding of how innovation diffuses, which is particularly important given Bangladesh's socioeconomic context, where a variety of factors

influence the adoption of new technology.

The results highlight how crucial sociocultural factors are when implementing and growing financial technologies in rural communities. The study shows that MFS can offer a robust way to conduct financial transactions, especially for those who are vulnerable to outside shocks like changes in the economy and climate. When combined, these findings provide a thorough understanding of the MFS situation among Bangladesh's marginal farmers and lay the groundwork for stakeholders to further the goal of financial inclusion through digital channels. The experiences presented here have wider ramifications and could offer insightful insights to other developing nations with comparable socioeconomic structures.

4.2 Discussion

The main argument of this thesis is the transformative potential of MFS in improving the financial inclusion of marginal farmers in Bangladesh. The research has uncovered a multitude of ideas regarding how digital platforms might empower some of the most economically marginalized groups in the context of developing countries, as a result of a thorough investigation of this potential.

A significant change in the financial environment has been brought about by MFS for marginal farmers who have historically been neglected by traditional banks. The less reliance on middlemen that has resulted from this change has strengthened these farmers' economic agency. As a key component of the adoption process, community networks have become increasingly significant, highlighting the role that social capital plays in the adoption of new technologies. The development of trust via these networks is essential, as is the oral communication of knowledge regarding the advantages and applications of MFS.

This new route is not without difficulties, though. According to the research, there is a learning curve involved in using MFS, which is made worse by problems with these platforms' usability. Because the population of marginal farmers has varying levels of literacy, more user-friendly interfaces that support local languages are needed to improve accessibility. Furthermore, there exist noteworthy apprehensions concerning the clarity of service charges and the resilience of security protocols, both of which are crucial in fostering confidence in MFS among prospective clients.

There are numerous ramifications for different ecosystem stakeholders. MFS providers have an obligation to make sure that their security measures are robust and that their service charges are transparent, in addition to optimising their platforms to meet the requirements of marginal farmers. At this point, traditional financial institutions need to reevaluate how they handle rural financing. They might even embrace the digital revolution and work with tech-driven solutions to broaden their customer base. With expectations oriented towards the establishment of a regulatory framework supportive of innovation and consumer protection, the role of the government stands out as being especially important. To optimise the reach and impact of MFS in such an environment, investments in digital infrastructure should be given top priority, particularly in rural and isolated locations.

The study has wider theoretical ramifications as well. It broadens the conversation on the digital divide by emphasizing that the problem involves more than just access to technology—it also involves the caliber of that access. The results clarify how marginal farmers make decisions within the constraints of current technology, which advances our understanding of behavioral economics. Furthermore, it adds to the body of information about the diffusion of innovation, especially when it comes to developing countries where socioeconomic factors have a significant impact on the uptake of new technology.

When considering the larger picture, the conclusions drawn from this research apply not only to Bangladesh but also to other developing nations with comparable socioeconomic structures. The research highlights the significance of socio-cultural factors while providing a paradigm for comprehending and improving financial inclusion using technology interventions. It emphasises how important it is to be mindful of the customs and beliefs that underline financial decisions made in rural areas. MFS serves as a light of resilience for financial transactions as the world navigates through economic uncertainty and climate problems, especially for marginal farmers whose livelihoods are vulnerable to such external shocks. Bangladesh's financial inclusion trajectory hinges on stakeholders' capacity to collaborate to improve MFS design and implementation. The ultimate objective is to establish a digital economy that is inclusive and in which all farmers are able to interact with digital financial services with competence and confidence. This thesis comes to the conclusion that, despite the complexity of the path towards full financial inclusion, it is pointing Bangladesh's marginal farmers in the direction of a more empowered and inclusive future.

4.3 Managerial Implication

Commercial banks can use this data to improve their MFS strategy by emphasizing customized product development, rural market penetration, and the creation of an extensive agent network that promotes trust and accessibility. The study promotes focused financial literacy initiatives, which are essential for raising MFS adoption. Moreover, the study emphasizes how important it is for banks to include marginal farmers in the process of providing feedback for better services, so that MFS products are tailored and user-centric to the needs of the farmers. Taking a cue from well-performing models such as Kenya's M-Pesa, the study emphasizes from a managerial standpoint how important it is for MFS providers to develop the agent network in order to increase accessibility and user experience. Marginal farmers could benefit from such development by getting simpler interfaces and services that are suited to their requirements. It forces established banks and financial organizations to rethink MFS as an auxiliary channel that expands their market penetration. Cooperation with MFS providers could increase market penetration and profit from existing infrastructures. The research indicates that in order to create an environment that is favorable for MFS and guarantee that innovation does not jeopardize consumer protection, government and regulatory organizations should prioritize enhancing connection and digital literacy. It is determined that telecommunications firms are essential components of this ecosystem and that they should modernize infrastructure, especially in rural regions, in order to guarantee continuous service availability for financial activities.

4.4 Recommendation

It becomes relevant to offer a range of strategic initiatives that can improve the effectiveness of these services and address the key issues that the research on MFS and their use for marginal farmers in Bangladesh uncovered. The recommendations are the result of a careful analysis of user experience, infrastructure capabilities, service design, and the complex socioeconomic environment in which these farmers work. One important suggestion that should not be overlooked is the extension of rural agent networks. Service providers need to get out of their urban comfort zones and into the rural hinterlands, where MFS adoption is still in its infancy. This is a calculated move that is more than just being physically there; it is about building familiarity and trust, which are important in areas where traditional banking has left a gap. Simplifying is yet another essential component of the suggested approaches. Reducing transaction complexity to its simplest straightforward version is necessary since it discourages people from adopting new technologies. Reluctance can be converted into

acceptance with a user interface designed with marginal farmers' cognitive and literacy levels in mind. There is still room for potential to fully fulfill the integration of MFS with the agricultural value chain. By collaborating with agribusiness companies, MFS can enable smooth transactions ranging from buying agricultural supplies to selling produce, thereby integrating financial services into the core of the agricultural process.

The customization of financial solutions for farmers is deemed essential, given the distinct financial demands of the agriculture industry. Financial resilience within agricultural communities could be improved via tailored financial instruments, such as microloans and insurance, that cater to the unique risk and time characteristics of farming operations. The importance of government cooperation and policy support is also emphasized. The creation of a supportive regulatory environment and the integration of MFS with national identity databases can hasten the uptake of services and provide a more secure transaction environment.

The study also emphasizes the significance of financial literacy. Programs for education that help marginal farmers understand digital financial instruments and procedures are essential. These courses ought to be created with the intention of equipping farmers with the skills they need to confidently traverse the MFS terrain. To handle peak loads and ensure service continuity, the technological infrastructure supporting MFS needs to be strong and resilient, especially during busy times like planting or harvest seasons. Infrastructure spending is an investment in dependability, which is a major factor in user confidence. Furthermore, a feedback loop is essential to user-centric service design. The relevance and accessibility of these services might be greatly increased by incorporating end-user experiences and insights into MFS's iterative design. Another important suggestion is to reward both users and agents. The adoption and continuous usage of MFS can be effectively accelerated by incentive programs, which will quicken the transition to greater financial inclusion.

Finally, it is critical that women are included in the MFS paradigm. Their importance in household financial management and agricultural sustenance makes it imperative to devise techniques that make it easier for them to obtain MFS.

The study's recommendations are meant to bring about a comprehensive enhancement in the availability and application of mobile financial services, which will in turn spur marginal

farmers in Bangladesh to become financially integrated and add to the larger picture of economic development and empowerment.

4.5 Theoretical reflections

By customising the Technology Acceptance Model for Bangladesh's specific agriculture sector, the research contributes to theoretical discussions on financial inclusion and advances our knowledge of technology uptake in poor nations. It expands on the story of financial empowerment by proposing a multifaceted strategy for financial inclusion that takes usability and economic integration into account in addition to accessibility. By emphasising the crucial role that infrastructure plays in the uptake of digital services, the study also advances the conversation on the digital divide.

4.6 Limitation and Future Research

This work does have certain limits, though. The results may not be as broadly applicable as they could be because of the concentration on a certain Bangladeshi demography. The use of self-reported data may generate biases, and there was little investigation of infrastructure-related problems. Subsequent investigations could tackle these constraints by carrying out comparison analyses among various areas, implementing longitudinal studies to evaluate the enduring effects of MFS, and exploring the underlying infrastructure requirements that support the implementation of MFS. To guarantee fair access and benefits for all genders, it is also necessary to investigate the gender dynamics surrounding MFS usage. Examining the possibilities of blockchain technology, artificial intelligence, and integrated marketplaces may provide new perspectives on how these breakthroughs may affect marginal farmers' financial inclusion as technology advances.

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Annexure 1

Questionnaire for marginal farmers

Demographics:

1. Please provide your age group:

- 18-25
- 26-35
- 36-45
- 46-55
- 56 and above

2. Gender:

- Male
- Female
- Other (please specify)

3. Educational background:

- No formal education
- Primary education
- Secondary education
- Higher education

4. Please specify your primary occupation.

Experience with Mobile Financial Services:

5. Have you ever used any mobile financial services?

- Yes
- No

(If no, proceed to question number 12)

6. How long have you been using mobile financial services?

- Less than 6 months

- 6 months to a year
- 1-2 years
- More than 2 years

7. How did you learn about mobile financial services?

- Friends/Family
- Community meetings
- Television/Radio
- Online/Social Media
- Other (please specify)

8. What are the primary activities for which you use mobile financial services? (You can choose more than one)

- Receiving payments for agricultural products
- Making payments for agricultural inputs (seeds, fertilizers, etc.)
- Personal or family remittances
- Saving money
- Accessing credit or loans
- Insurance services

Perceptions and Attitudes:

8. Can you describe your initial experiences with using mobile financial services? What were some of the challenges you faced?

10. How do you perceive the level of security and trust in using mobile financial services for financial transactions?

11. Can you describe any training or support you received in using mobile financial services? What further support or training do you think is needed?

Barriers and Opportunities:

12. If you have not used mobile financial services, what has been the primary reason?

- Lack of awareness
- Lack of trust in technology
- Difficulty in using technology
- Other (please specify)

Open-Ended:

1. Have you encountered any technical issues while using mobile financial services? If yes, please describe.
2. Can you describe any experiences where the service charges or fees were not clear or were higher than expected?
3. Have there been instances where you felt the mobile financial services were not secure enough? Please elaborate.
4. Have you faced any challenges regarding the accessibility or usability of mobile financial services, such as language barriers, complex user interfaces, etc? Please explain in detail.
5. Can you share any experiences where resolving disputes or addressing grievances with the service provider was difficult?
6. Have there been occasions where network or connectivity issues affected your ability to use mobile financial services effectively? Please describe.
7. Can you describe any specific instances where mobile financial services proved to be especially beneficial in facilitating your farming activities?
8. Have mobile financial services facilitated any new business opportunities or partnerships for you? If yes, please elaborate.
9. Are there any agricultural activities for which you wish to use mobile financial services but currently are not able to? Please explain.

10. Can you share any experiences where mobile financial services have helped you overcome financial challenges or crises?

Annexure 2

Questionnaire for mobile financial services officials and agents

1. In your opinion, how have mobile financial services impacted the financial inclusion of marginal farmers in your community?
2. How do you perceive the future of mobile financial services in aiding financial inclusion for marginal farmers in Bangladesh?
3. In your opinion, what role can government and non-government organizations play in promoting the use of mobile financial services among marginal farmers?
4. In your opinion, what are the main barriers that prevent marginal farmers from accessing and using mobile financial services?
5. Can you suggest any strategies or interventions that could encourage more marginal farmers to adopt mobile financial services?
6. Do you feel that mobile financial services have brought farmers closer to formal financial systems? If yes, in what ways?
7. In your opinion, how have mobile financial services influenced farmer's financial management and planning? Please provide examples.
8. How do you perceive the role of mobile financial services in enhancing the financial literacy and awareness among farmers?
9. In your perspective, what additional improvements or features in mobile financial services could further enhance financial inclusion for farmers in Bangladesh?

Annexure 2

List of interview Participants:

Group	Pseudonym	Location (District in Bangladesh)	Age group	Education	Date of interview	Interview Medium	Interview Language
Marginal Farmers	101	Feni	18-25	Primary	05.07.2023	Messenger	Bengali
	102	Feni	26-35	Primary	05.07.2023	Messenger	Bengali
	103	Feni	46-55	Primary	05.07.2023	Messenger	Bengali
	104	Mymensingh	26-35	Secondary	15.07.2023	Messenger	Bengali
	105	Mymensingh	46-55	Secondary	15.07.2023	Messenger	Bengali
	106	Mymensingh	18-25	Primary	15.07.2023	Whatsapp	Bengali
	107	Mymensingh	36-45	Secondary	15.07.2023	Whatsapp	Bengali
	108	Mymensingh	36-45	Unschoolled	17.07.2023	Whatsapp	Bengali
	109	Mymensingh	36-45	Primary	17.07.2023	Messenger	Bengali
	110	Mymensingh	26-35	Unschoolled	17.07.2023	Messenger	Bengali
	111	Mymensingh	36-45	Primary	17.07.2023	Whatsapp	Bengali
	112	Mymensingh	36-45	Primary	17.07.2023	Whatsapp	Bengali
	113	Mymensingh	46-55	Primary	29.07.2023	Whatsapp	Bengali
	114	Mymensingh	26-35	Secondary	29.07.2023	Whatsapp	Bengali
	115	Mymensingh	56-up	Primary	29.07.2023	Whatsapp	Bengali
MFS Officials	201	Feni	26-35	Masters	18.07.2023	Whatsapp	Bengali
	202	Dhaka	26-35	Masters	18..07.202 3	Whatsapp	Bengali
	203	Dhaka	46-55	Secondary	07.07.2023	Whatsapp	Bengali

	204	Dhaka	46-55	Masters	07.07.2023	Whatsapp	Bengali
	205	Mymensingh	36-45	Masters	07.07.2023	Whatsapp	Bengali
MFS agents	301	Feni	26-35	Primary	12.08.2023	Messenger	Bengali
	302	Feni	36-35	Secondary	20.08.2023	Messenger	Bengali
	303	Dhaka	26-35	Primary	20.08.2023	Messenger	Bengali