

**Financial Inclusion in Rural Bangladesh: The Impact of Mobile Financial Services on the Underbanked Population**

**BY**

**Md Saifur Rahman**  
**ID: 232-25-054**

This Report Presented in Partial Fulfillment of the Requirements for  
The Degree of Masters of Science in Computer Science and Engineering

**Supervised By**

**Abdus Sattar**  
Assistant Professor  
Department of CSE  
Daffodil International University

**Co-Supervised By**

**Dr. Arif Mahmud**  
Associate Professor & Program Director MIS  
Department of CSE  
Daffodil International University



**DAFFODIL INTERNATIONAL UNIVERSITY**  
**DHAKA, BANGLADESH**  
**JANUARY 11, 2025**

## APPROVAL

This Thesis titled “**Financial Inclusion in Rural Bangladesh: The Impact of Mobile Financial Services on the Underbanked Population**”, submitted by **Md Saifur Rahman**, ID No: **232-25-054** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 11-01-2025.



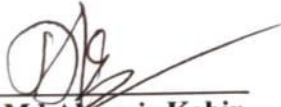
**Dr. S.M Aminul Haque**  
**Professor and Associate Head**  
Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Chairman**



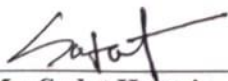
**Dr. Fizar Ahmed**  
**Associate Professor**  
Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Internal Examiner**



**Dr. Md Alamgir Kabir**  
**Assistant Professor**  
Department of Computer Science and Engineering  
Faculty of Science & Information Technology  
Daffodil International University

**Internal Examiner**



**Mr. Sadat Hossain**  
**Data Scientist**  
Risk Management Division,  
BRAC Bank Limited

**External Examiner**

## DECLARATION

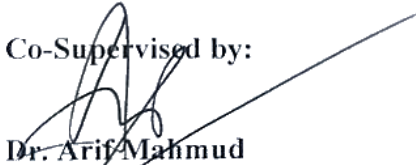
I hereby declare that this research has been done by me under the supervision of **Abdus Sattar**, Assistant Professor, Department of CSE, Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

**Supervised by:**



**Abdus Sattar**  
Assistant Professor  
Department of CSE  
Daffodil International University

**Co-Supervised by:**



**Dr. Arif Mahmud**  
Associate Professor & Program Director MIS  
Department of CSE  
Daffodil International University

**Submitted by:**



**Md Saifur Rahman**  
ID: 232-25-054  
Department of CSE  
Daffodil International University

## ACKNOWLEDGEMENT

First, I express my heartiest thanks and gratefulness to Almighty Allah for His divine blessing which makes it possible to complete the final year Thesis successfully.

I am really grateful and wish my profound indebtedness to **Abdus Sattar, Assistant Professor**, Department of CSE, Daffodil International University, Dhaka, deep knowledge & keen interest of my supervisor in the field of Machine Learning to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stages have made it possible to complete this project.

I would like to express my heartiest gratitude to **Dr. Sheak Rashed Haider Noori, Head**, Department of CSE, for his kind help to finish our project and also to other faculty members and the staff of CSE department of Daffodil International University.

Finally, I must acknowledge with due respect the constant support and patients of my parents.

## **ABSTRACT**

The growth of Mobile Financial Services (MFS) is becoming more popular now as a tool for increasing access to financial services in the developing countries including Bangladesh. This paper evaluates the roles of MFS in empowering the unbanked especially in rural areas, while investigating its impact on reducing gender disparities and addressing demographic differences in financial inclusion. Participants from both rural and urban areas were surveyed through personal interviews from Savar Upazila, Dhaka, with a total 404 head participants. To considerable hypotheses about MFS usage and its impact on financial incorporation, one sample t-test, two sample t-test and chi-square test were employed. Findings reveal that MFS has enhanced the provision of financial mobile services among the rural folks. Nevertheless, the level of MFS usage is significantly higher among people who were previously enrolled with formal banks, which proves that MFS in a way is integrated into the conventional financial systems. While MFS has improved financial inclusion for women, significant gender disparities persist, requiring targeted initiatives to close the gap. The study proves that the MFS has played a vital role in enhancing the financial inclusion. Further research is essential to address the technological gaps and other demographic barriers to maximize the potential of mobile financial services in promoting inclusive economic growth.

## TABLE OF CONTENT

CONTENTS	PAGE NO
Title Page	i
Board of examiners	ii
Declaration	iii
Acknowledgements	iv
Abstract	v
<b>CHAPTER</b>	
<b>CHAPTER 1: INTRODUCTION</b>	<b>1-4</b>
1.1 Introduction	1
1.2 Motivation	2
1.3 Rationale of the Study	2
1.4 Research Questions	3
1.5 Expected Output	3
1.6 Project Management and Finance	4
1.7 Report Layout	4
<b>CHAPTER 2: BACKGROUND</b>	<b>6-11</b>
2.1 Related Works	6
2.2 Research Gap	8
2.3 Hypothesis Development	8
2.4 Comparative Analysis and Summary	9
2.5 Scope of the Problem	10
2.6 Challenges	11
<b>CHAPTER 3: RESEARCH METHODOLOGY</b>	<b>12-17</b>
3.1 Research Subject and Instrumentation	12
3.2 Data Collection Procedure	13
3.3 Analysis Strategy	16
3.4 Applied Mechanism	16
3.5 Technological Resources	17
<b>CHAPTER 4: EXPERIMENTAL RESULTS AND DISCUSSION</b>	<b>18-28</b>
4.1 Analysis and Result	18
4.2 Discussion	26

<b>CHAPTER 5: IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY</b>	<b>29-32</b>
5.1 Impact on Society	29
5.2 Impact on Environment	30
5.3 Ethical Aspects	30
5.4 Sustainability Plan	31
<b>CHAPTER 6: CONCLUSION AND FUTURE WORK</b>	<b>33-35</b>
6.1 Summary of the Study	33
6.2 Conclusions	33
6.3 Implication for Further Study	34
6.4 Policy Recommendation	34
<b>REFERENCES</b>	<b>36-37</b>

## LIST OF FIGURES

<b>FIGURES</b>	<b>PAGE NO</b>
Fig 1: Research Design Diagram	12
Fig 2: Location of Data Collection, Savar Upazila, Dhaka.	13
Fig 3: MFS Users in Savar.	18
Fig 4: Changes in Access to Financial Services through Mobile Financial Services.	19
Fig 5: Change in Financial Services Access for Rural MFS Users.	19
Fig 6: Bank Account Access for MFS Users.	20
Fig 7: MFS Usage Rates by Previous Banking Access.	21
Fig 8: Gender Differences in Bank Account Ownership and MFS Usage.	23
Fig 9: Gender Differences in Financial Inclusion.	23
Fig 10: Perceptions on Mobile Financial Services Accessibility for Women.	24
Fig 11: Perception of MFS Impact on Women's Financial Inclusion.	25

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

The Mobile Financial Services (MFS) model has significantly transformed the digital financial landscape in Bangladesh. In an economy where a significant chunk of the population including many in rural areas still lacks access to basic banking and insurance services, MFS has proven to be a potent vehicle for financial inclusion. The Financial Revolution is a must-needed revolution for economic growth and social equity, enabling access to basic financial services such as savings, credit and remittances [1], [2]. The MFS platforms [such as bKash, Rocket and Nagad] have filled the gap between the banked vs unbanked populations, allowing for access to financial services in areas where traditional banking infrastructures are non-existent [3].

Bangladesh Bank supportive frame works and mobile phone penetration has significantly accelerated the adoption of MFS across the Bangladesh [4]. With the progressive development of MFS, it has gained an influential role in improving the degree of financial access, particularly among disadvantaged groups, including the rural population and women who have traditionally been excluded from formal banking systems [5]. Despite these advances, however, multiple challenges to total adoption remain such as digital literacy, trust in the system, and rural infrastructural deficits [6].

The scope of the research is to explore the potential of Mobile Financial Services as a tool to help in deepening financial inclusion in Bangladesh. It will focus mostly on the underbanked populations. The study will address the demographic factors, mainly gender and the urban versus rural divisions, that are affecting the usability of MFS as well. The study will present the data in a detailed statistical way as well as provide user experiences on how mobile financial services can be used to achieve inclusive economic growth.

## **1.2 Motivation**

The motivation behind this research is derived from the increasing significance of financial inclusion as a means to ensure sustainable economic development in Bangladesh. The World Bank, in its report, states that financial inclusion is one of the major requisites for poverty alleviation and economic growth since it provides people with the means of managing risks, education, and investment, as well as of constructing financial resilience [2]. In Bangladesh, Mobile Financial Services can be a solution for the fact that one of the major problems of the country is that a large portion of the population has no access to formal financial services.

Besides, the emergence of digital financial platforms such as bKash, Rocket and Nagad has aroused questions about their real effects on the economy, more so on the empowerment of the underbanked population. MFS (Mobile Financial Services) could be the answer to the question of how to enable the ones who are unbanked and underbanked, but very little has been done in terms of empirical evidence. The purpose of this research is to reveal the impact of MFS on financial inclusion in the real world with an emphasis on rural and marginalized communities [7].

In addition, the gender gap in financial inclusion remains a pressing issue in Bangladesh. Despite the increasing adoption of MFS, women are still less likely to access financial services compared to men, due to cultural and societal barriers [8]. This research aims to investigate how MFS can help close this gap and what steps are necessary to ensure that women benefit equally from the opportunities provided by mobile financial platforms.

## **1.3 Rationale of the Study**

The purpose of this study is due to the key role that financial inclusion plays in promoting sustainable economic growth and reducing inequality. In countries where a significant portion of the population remains outside of the formal financial sector, such as Bangladesh, mobile financial services have become a viable solution for enhancing financial access [9]. MFS platforms enable customers to make transactions, store money, and borrow funds using mobile phones, thus evading the problems of traditional banks. The latter function is especially useful in rural areas where bank branches are few [10].

Bangladesh's monetary inclusion goals are being realized thanks to the introduction of this research. The government and banking regulators such as Bangladesh Bank have helped to increase digital financial services by linking it to a bigger plan to provide financial access for people who have been neglected [11]. Nevertheless, despite these endeavors, research has shown that there are still some gaps in the literature regarding the long-term effects of MFS on financial inclusion, notably within specific demographic groups such as female and rural populations [5].

The study will also provide the vital information for policymakers and financial providers on how to get rid of the existing limitations of mobile financial services. In such issues as digital literacy, trust in financial technology, and the possibility of owning mobile phones are key to the design of financial products which provide financial service inclusive [12]. Through the identification of these challenges and the proposal of solutions, this research intends to contribute to the development of the strategies that are more effective in the promotion of financial inclusion in Bangladesh.

#### **1.4 Research Questions**

This study seeks to answer the following research questions:

1. How has the introduction of Mobile Financial Services (MFS) contributed to the level of financial inclusion among rural populations in Bangladesh?
2. To what extent is Mobile Financial Services (MFS) usage higher among previously unbanked populations compared to those who have access to traditional banking services?
3. How has the adoption of Mobile Financial Services (MFS) impacted the reduction of the gender gap in financial inclusion in Bangladesh?

#### **1.5 Expected Output**

The study will quantify as it will reveal the empirical data showing how Mobile Financial Services (MFS) have been a major cause of financial inclusion in Bangladesh. This will then comprise the statistical analysis, it will be based on user demographics, usage patterns, and the causal relationship between the rural and urban populations. Thus, the study's examination of these aspects will aim to visualize clearly the contribution of MFS to the access to financial services.

The research has also the purpose of identifying the obstacles that prevent MFS from being adopted by vulnerable groups, especially those that are overlooked. These can be issues such as digital hunger for

knowledge, the distance to technology, or a lack of trust in financial institutions. Through showing such drawbacks, the study will be able to give information that is pertinent for policymakers and service providers in order to develop strategies that are targeted to the specific needs of these people and hence promote financial inclusion which will be more equitable.

Finally, the research will come up with strategies or policy recommendations to improve MFS in terms of advancing financial inclusion which may include the following. The measure of digital literacy taking into consideration ways of instilling technology trust and framing regulatory policy that balances consumer protection with innovation. We want to make sure that MFS can remain sustainable as it grows and at the same time, it reaches out to the underserved bulk of the population.

## **1.6 Project Management and Finance**

The total finance of the work is arranged by myself.

## **1.7 Report Layout**

This thesis is structured as follows:

- **Chapter 1:** Introduction, which outlines the background, motivation, research questions, and expected outcomes of the study.
- **Chapter 2:** Background, which provides a detailed review of the relevant literature on Mobile Financial Services and financial inclusion, as well as a comparative analysis of previous studies.
- **Chapter 3:** Research Methodology, which explains the research design, data collection methods, and analysis techniques used in the study.

- **Chapter 4:** Experimental Results and Discussion, which presents the findings of the research and provides an in-depth analysis of the results.
- **Chapter 5:** Impact on Society, Environment, and Sustainability, which explores the broader implications of the research for society and the environment.
- **Chapter 6:** Summary, Conclusion, Recommendation, and Implication for Future Research, which summarizes the study, draws conclusions, and suggests areas for further research.

## **CHAPTER 2**

### **BACKGROUND**

#### **2.1 Related Works**

Mobile Financial Services (MFS) have transformed the way people interact with the world by allowing them to access banking and financial services using their phones. MFS encompasses features such, as banking, mobile payments and person to person (P2P) transfers all of which're essential, in advancing financial inclusion particularly in areas where traditional banking services are scarce [13], [14]. Ensuring inclusion means offering timely and sufficient access, to financial services for everyone, in society especially those who are often overlooked or do not have bank accounts [2]. Enabling individuals to save, borrow and invest plays a role, in decreasing poverty and enhancing collective prosperity [17].

Bangladesh has experienced a growth, in financial services thanks to the rising usage of mobile phones and favorable regulatory measures from the Bangladesh Bank. Platforms like bKash and Rocket play a role, in delivering solutions to millions of people especially in remote and underserved regions [3]. MFS can be able to help improve financial inclusion in the society through offering financial services that are easily accessible to the unbanked people [1]. MFS has the capacity to increase financial inclusion by providing other possible routes to the people who are left out from the former financial system [9], [18]. Mobile Financial Services (MFS), in Bangladesh is responsible for allowing more people to access financial transaction, remittances and bills payments [11]. The accessibility of these services through mobile devices is particularly beneficial in a country like Bangladesh, where traditional banking infrastructure is often limited in rural areas.

It is argued that there are quite a few barriers against adoption of mobile financial services. Significant challenge remains in digital literacy, particularly among older and rural citizens [5]. User adoption is also influenced by security matters and doubts regarding trust. When it comes to MFS, users tend to be hesitant because of the risk factors they perceive in terms of fraud and not having trust on digital platforms centres [9]. The use of MFS in particular is significantly affected by population structure. The application of MFS is more common among the young and those who

have a high level of education as well as income [9]. Gender disparities also exist, with men being more likely to use MFS than women, often due to cultural and social constraints [8]. The need for targeted strategies to improve MFS adoption among diverse groups is discussed in light of these demographic variables in Bangladesh.

MFS gives financial management solutions that help save, budget, and manage finance better. [14] MFS has allowed the people in Bangladesh to acquire financial services that were not available before thus assisting them to handle their funds in a better way and at the same time ensuring security [6]. The growth of MFS has been facilitated with the help of e payments regulatory framework and Bangladesh Bank was instrumental in this. Competition driven policies, consumer protection and development of digital infrastructure that enhances continued MFS growth and effectiveness are what it takes to have an efficient system [11]. MFS supports the unbanked in positively by operating within the gaps of financial exclusion. Thus, through offering safe and convenient options for financial operations, MFS enables its users to contribute to the representatives of the form economy, thus promoting economic growth and development [9]. Furthermore, it is notable that MFS can increase the effectiveness of financial services, and subsequently lower them and bring them within the means of lowly income users [19].

To overcome obstacles and scale up financial inclusion through mobile financial services, a favorable policy environment is needed [20]. Policies that enable development of innovation coupled with consumer protectionism are critical for MFS steady growth. In Bangladesh, the most significant actor is the Bangladesh Bank that has come up with policies to support competition and the use of MFSs [21].

However, there are many areas that have not been explored well in the literature though they are important in the context of the use of MFS for increasing the level of financial inclusion. First, most papers analyze the level of MFS usage in a general population without exploring the potential differences in the impact on a selected demographic group, such as the elderly, youth, or women living in rural areas. This creates a knowledge gap when it comes to the cross-sectional use of MFS by age, gender, and socio-economic status [2], [5]. There is a need for future research to understand how these subgroups of consumers gain value from MFS and which factors may hinder them from doing so.

## **2.2 Research Gap:**

Mobile Financial Services (MFS) literature targets changes in the short term but lacks insights into the long-term behavioral changes of MFS users other than rural users. There is also little research on the issues unbanked people can have, like trust or digital literacy, that prevent them from going fully banked. While practising MFS has ensured a reduction of the gender restraints, little has been done in the matter of social and cultural bounds that relegate women to the minimal participation. Finally, the technological barriers between MFS users and non-users are not very well researched. Filling these gaps will further enhance comprehension of how MFS can actually increase financial inclusion.

## **2.3 Hypothesis Development:**

This research aims to examine the impact of MFS on these distinct groups by developing three hypothesizes that explore how MFS has influenced financial inclusion in these areas. The first hypothesis investigates whether MFS has increased financial inclusion in rural areas, which have historically been underserved by traditional banking system. The second hypothesis assesses the extent of which MFS has been adopted by previously unbanked individuals, who have faced barriers such as high transaction costs, limited physical access to banks and stringent account-opening procedures. Finally, the third hypothesis focuses on the role of MFS in reducing the gender gap in financial inclusion by offering women greater access to financial services.

### **Hypothesis 1: MFS and Rural Financial Inclusion**

**Hypothesis:** Mobile Financial Services (MFS) have significantly increased the level of financial inclusion among rural populations in Bangladesh.

Mobile Financial Services commonly regarded as MFS is believed to have played a huge role in the formation of financial inclusion where innovations such as MF has enhanced the efficiency of providing financial services where it was near impossible to penetrate through the traditional banking methods. The rural users have a unique issue with accessing the banking and financial services for various reasons including; geographic location of the users, level of income of the targeted group, and the availability of appropriate products in the market [2]. A similar situation can be observed with MFS as this technology can avoid the mentioned challenges because it does

not necessarily need block infrastructure and can be delivered via mobile phones. This hypothesis seeks to find out if MFS have managed to extend the financial frontier of rural population, hence increasing its inclusion in the financial market as hypothesized by [13].

### **Hypothesis 2: MFS Usage Among Previously Unbanked Populations**

**Hypothesis:** The usage of Mobile Financial Services (MFS) is higher among previously unbanked populations compared to those who already had access to traditional banking services.

Another idea of MFS is to help segments of the population that are not included in the banking system. The previously excluded clients define obstacles like strict procedures for opening the account, high charges, and low branch coverage [14]. MFS with their relatively easier access and entry barriers therefore are seen positioned as more viable and easier for these unbanked persons. This hypothesis questions the level at which MFS has gained access to banking services by persons who cannot be said to have been part of the banking system and MFS is most likely to be a tool that supports the financial inclusion agenda of many people [5].

### **Hypothesis 3: MFS and Gender Gap in Financial Inclusion**

**Hypothesis:** Mobile Financial Services (MFS) have reduced the gender gap in financial inclusion in Bangladesh.

The topic of financial exclusion according to gender is a pandemic problem, where women are likely to be locked out of the financial system than men. These hurdles are; Culture, Financial literacy, and lack of formal identification [2]. However, MFS has the capabilities to penetrate this restrictive gap and make female clients accessible and more convenience in, requesting for, and receiving financial products and services. In a nutshell, this hypothesis tries to explore one of the key propositions of this study that is- does MFS play any role to reduce gender gap in Bangladesh and increase women borrower's access to the financial system [15].

## **2.4 Comparative Analysis and Summary**

The comparison of the research works of different countries and regions on the Mobile Financial Services (MFS) reveals the similarities and differences between them. Among the obvious things are the MFS activities that act as a tool to overcome the distance to financial inclusion. This is a very important area for African and South Asian regions where banking infrastructure is not

available as merely a few traditional banks operate. MFS will be a feasible option for them to take over money management [13], [14]. In Bangladesh the MFS software “bKash, Nagad, Rocket and others” are a must for transferring money in rural locations, where the rest of the banking market is a banking desert [4].

The dominating area of the gender gap in financial inclusion is often the center point of the studies. Albeit, the advent of MFS considerably enhanced women's financial inclusion; nevertheless, it is very often that events involving the usage of services by women are attributed to socio-cultural influences, low digital literacy, and limited access to mobile phones [8]. Still, these targeted interventions (digital literacy programs and gender-sensitive financial products) have the potential to be the solution [5].

Regional differences are evident in the regulatory frameworks that govern MFS. In Kenya, the success of M-PESA was supported by a flexible regulatory environment that fostered innovation while ensuring consumer protection [14]. In Bangladesh, while regulations are supportive, they are more cautious, with the Bangladesh Bank enforcing controls to maintain market stability and security [22], This approach ensures trustworthiness but may slow innovation [23].

Digital literacy also varies across regions and influences MFS adoption. In Kenya, higher levels of digital literacy and widespread mobile phone usage have led to faster adoption of MFS [9]. In Bangladesh, lower digital literacy, particularly in rural areas and among women, has slowed adoption [12].

## **2.5 Scope of the Problem**

Financial exclusion is still a problem in Bangladesh with a large percentage of the rural poor and few options for formal financial access. A great number of these rural habitants are adopting informal schemes because of the lack of well-established banking infrastructure, which in turn is restraining them from being able to save, loan, or invest safely. Mobile Financial Services (MFS) platforms such as bKash and Rocket although have contributed to offering alternatives, still remain circumscribed in reaching a majority of the underserved people.

Another issue is the gender gap in financial inclusion, which is more serious than the aforementioned problem. Women, who make up the larger part of the population especially in rural areas, experience cultural barriers, lack of education on mobile usages, and are sometimes discouraged from carrying mobile phones which hinder their financial access altogether. This alienation not only deprives them of opportunities for self-empowerment but also retards the overall economic development of the country.

In addition, the low level of digital literacy is another impediment to immigrants' adaptation to the e-government environment. The main reason behind the lack of skills to use MFS effectively is the fact that the majority of potential users are either older people or residents of rural areas. On the one side of the coin, there is a massive trust of the customers in digital financial services. However, on the other side, many people are worried about potential security breaches and fraud. Putting the necessary measures in place for the successful tackling of these issues is a combination of digital literacy programs, effective legislation, and the creation of confidence in the security and reliability of these services.

## **2.6 Challenges**

In the last couple of years, the Mobile Financial Services (MFS) sector in Bangladesh has achieved steady growth in terms of the financial inclusion of the unbankable population, despite some challenges still being present. Digital literacy is the main concern among rural areas and women, in this respect. People are not sufficiently skilled in using MFS efficiently. There are still gender gaps as many women are prevented from participating by socio-cultural factors. Besides, their limited access to mobile phones is also a problem, which makes it necessary to use targeted interventions.

Trust and security issues, mainly regard to fraud, hinder a lot of individuals who would otherwise embrace MFS from doing so. Infrastructure problems are, for example, in the case of unreliable mobile networks in rural areas, and hence, they are not well connected to these services. The government needs to reconsider some of the elements of the regulatory framework, such as innovation on the part of the operators but also consumer protection, which can further foster the

long-term growth of this area. Solving these problems is therefore of crucial importance for MFS to achieve its maximum potential in Bangladesh.

# CHAPTER 3

## RESEARCH METHODOLOGY

### 3.1 Research Subject and Instrumentation

The research focuses on the impact of Mobile Financial Services (MFS) on financial inclusion in Bangladesh, particularly among underbanked populations in rural and urban areas. A total of 404 participants were involved in the study, selected from both rural and urban regions. The sample was designed to capture a diverse set of respondents, including individuals with varying levels of access to financial services and different socio-economic backgrounds. The participants were surveyed and interviewed to gain a deeper understanding of how MFS influences financial behavior, with an emphasis on gender disparities and barriers to MFS adoption

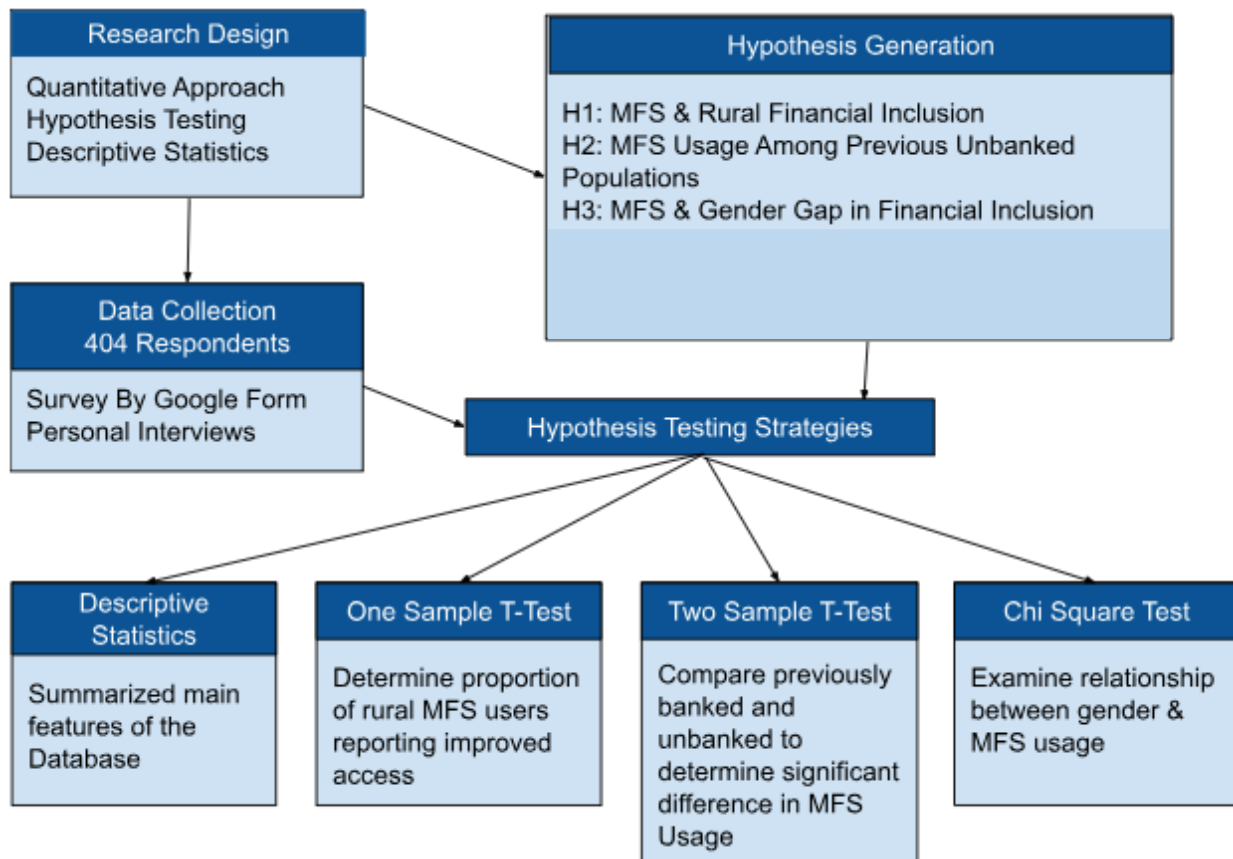


Fig 1: Research Design Diagram

Primary instruments were used in the research:

- **Interviews:** Personal interviews were conducted to gain qualitative insights into the participants' experiences with MFS and barriers they encountered in adopting the services.

### 3.2 Data Collection Procedure

We conducted a face-to-face survey using a structured questionnaire, where responses are recorded electronically through Google Form, making it a quantitative, survey-based approach. The participants in the survey were selected at random. The survey was conducted through in-person interviews in the both rural and urban areas not stranding far from target location Savar Upazila, Dhaka (Fig. 2). Ranging from self-employed people businessmen or workers to aged housewives and students also. All respondents were adult. Finally, 404 respondents were recorded as primary data for our analysis.

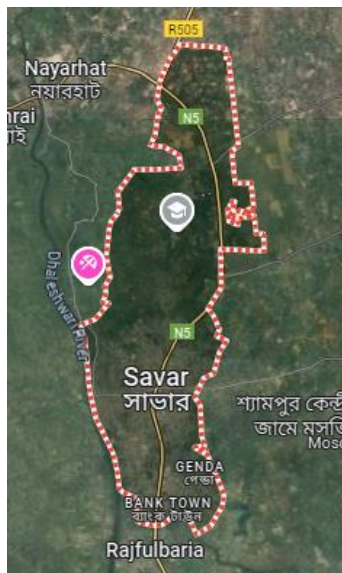


Fig 2: Location of Data Collection, Savar Upazila, Dhaka

The questionnaires were mostly either

**Dichotomous Questions:** These are the yes/no questions. They offer two possible responses, usually "Yes" or "No", and are used for obtaining clear, binary information from respondents. Or

**Likert Scale Questions:** These questions measure the level of agreement or disagreement with a given statement on a symmetric agree-disagree scale, typically ranging from "Strongly Agree" to "Strongly Disagree".

The questions asked in the survey were:

- Age of the respondents
- Gender of the respondents
- Where the respondent lives
- Where they are from
- Their Employment Status
- Do they have a bank account in their name?
- Do they use any Mobile Financial Services (e.g., bKash, Rocket, Nagad)?
- How often do they use Mobile Financial Services?
- Which Mobile Financial Services do they use?
- For what purposes do they use Mobile Financial Services?
- Did they have access to banking services before using Mobile Financial Services?
- How has their access to financial services changed since they started using Mobile Financial Services?
- Do they feel that Mobile Financial Services have made it easier for them to manage their finances?
- What were the main barriers they faced before using Mobile Financial Services?
- Have they encountered any barriers while using Mobile Financial Services?
- Do they think Mobile Financial Services have made financial services more accessible for women in their community?
- Do women in their household use Mobile Financial Services?
- How satisfied are they with the Mobile Financial Services they use?
- Do they plan to continue using Mobile Financial Services in the future?
- What improvements would they suggest for Mobile Financial Services? (Open-ended)
- Do they have any additional comments or suggestions regarding Mobile Financial Services and financial inclusion? (Open-ended)

### 3.2.1 Sample Size Determination

The participants in the survey were selected at random. The survey was conducted through physical interviews in the rural areas not stranding far from target location Savar Upazilla, Dhaka. Ranging from University student, self-employed people businessmen or workers to aged housewives.

Savar Upazila, in Dhaka District, is home to around 1.5 million people, with 40-45% living in urban areas and the rest in rural regions. The adult population makes up about 55-60% of the total, with many working in industries or agriculture. Savar's literacy rate is approximately 70-75%, with urban areas showing higher literacy at over 80%, while rural regions have rates around 60-65%. Urbanization and industrial growth have spurred population and educational development, though rural areas still face challenges in education access.

To determine the sample size for our study, we have used the most commonly used formula for estimating the sample size for a proportion

#### Infinite sample size

$$SS = \frac{Z^2 \cdot p \cdot (1 - p)}{C^2}$$

#### Finite sample size,

$$n = \frac{SS}{1 + \frac{SS-1}{Pop}}$$

Explanation of the term:

- **SS: Sample Size for Infinite Population** — The number of observations needed if the population were infinite.
- **Z: Z-Score** — Represents the confidence level (e.g., 1.96 for 95% confidence).
- **p: Proportion** — Estimated proportion of the population.
- **C: Margin of Error** — The maximum acceptable difference between the sample proportion and the true population proportion.
- **Pop: Population Size** — The total number of individuals in the population.

## Given Parameters

- **Population size (Pop):** 13,85,910 (The rural population of Savar Upazilla is taken as Population size)
- **Confidence level:** 95% (so,  $Z \approx 1.96$ )
- **Margin of Error (C):** 5% or 0.05
- **Proportion (p):** 0.5 (for maximum sample size)

So the Infinite Sample size,  $SS$  would be,  $SS \approx 384.16$

If we adjust for our finite population size,  $n \approx 382.1$

### 3.3 Analysis Strategy

Each hypothesis was analyzed using their appropriate hypothesis tests. The tests used descriptive analysis, cross tabulations and hypothesis testing to determine the acceptability of each hypothesis. The tests used in this study were One Sample T-test, Two Sample T-test, Chi-square Test and to measure effect size Cramer's V for Chi-Square Test and Cohen's d for T-test

### 3.4 Applied Mechanism

The research employed a quantitative approach to test the following hypotheses:

1. MFS has significantly increased financial inclusion among rural populations.
2. MFS usage is higher among previously unbanked populations compared to those with prior access to traditional banking services.
3. MFS has reduced the gender gap in financial inclusion.
4. MFS users report fewer barriers to financial access compared to non-users.

The hypotheses were tested using the aforementioned statistical methods, and visualizations were generated using Python-based tools such as Matplotlib. Data manipulation was conducted using Pandas and NumPy libraries, while hypothesis testing was performed using SciPy. The results were visualized to demonstrate the distribution and relationships between key variables.

### **3.5 Technological Resources**

**Google forms:** Google forms have been used to acquire data from the masses. As well as live interviews were conducted and added in the forms datasheet as well

**Python:** For analysis purposes, the language selected was python. It's extensive list of methodologies and ease of use drew us to use this language for analysis purposes

**Pandas, Numpy & Scipy:** Pandas and Numpy were the primary modules for datasheet modifications and manipulation. Most of the formulas included in the analysis strategies were used from these libraries

**Matplotlib & Julius AI:** Matplotlib and Julius AI were heavily used to plot detailed and advanced visualizations of the data.

# CHAPTER 4

## EXPERIMENTAL RESULTS AND DISCUSSION

### 4.1 Analysis and Result

#### 4.1.1 Data Analysis

The primary data in this study is used for hypothesis testing to understand the impact of Mobile Financial Services (MFS) on financial inclusion in Bangladesh. The primary data, collected through surveys and interviews, helps test specific hypotheses about MFS usage, such as its impact on financial inclusion in rural areas, gender differences, and barriers faced by users. By analyzing responses from different groups (e.g., rural vs. urban, male vs. female), the study can identify significant differences and trends. Techniques like t-tests and chi-square tests are used to determine if observed differences are statistically significant, providing robust evidence for or against the hypotheses. The data also helps identify and quantify barriers to MFS usage, offering insights into areas needing improvement.

#### Hypothesis 1:

Null Hypothesis (H<sub>0</sub>): Mobile Financial Services (MFS) have not significantly increased the level of financial inclusion among rural populations in Bangladesh

Alternative Hypothesis (H<sub>a</sub>): Mobile Financial Services (MFS) have significantly increased the level of financial inclusion among rural populations in Bangladesh.

To test this hypothesis, we'll use both descriptive statistics and hypothesis testing. We'll focus on the rural population and their use of Mobile Financial Services (MFS).

	proportion
<b>Do you use any Mobile Financial Services (e.g., bKash, Rocket, Nagad)?</b>	
No	56.16438356164384
Yes	43.83561643835616

Fig 3: MFS Users in Savar

Interestingly, about 43.84% of the rural population uses Mobile Financial Services, while 56.16% do not.

	proportion
<b>How has your access to financial services changed since you started using Mobile Financial Services?</b>	
<b>Significantly improved</b>	46.875
<b>Somewhat improved</b>	31.25
<b>No change</b>	21.875

Fig 4: Changes in Access to Financial Services through Mobile Financial Services

For rural MFS users, the change in access to financial services is quite positive:

- 46.88% reported significantly improved access
- 31.25% reported somewhat improved access
- 21.88% reported no change

Here's a visual representation of this data:

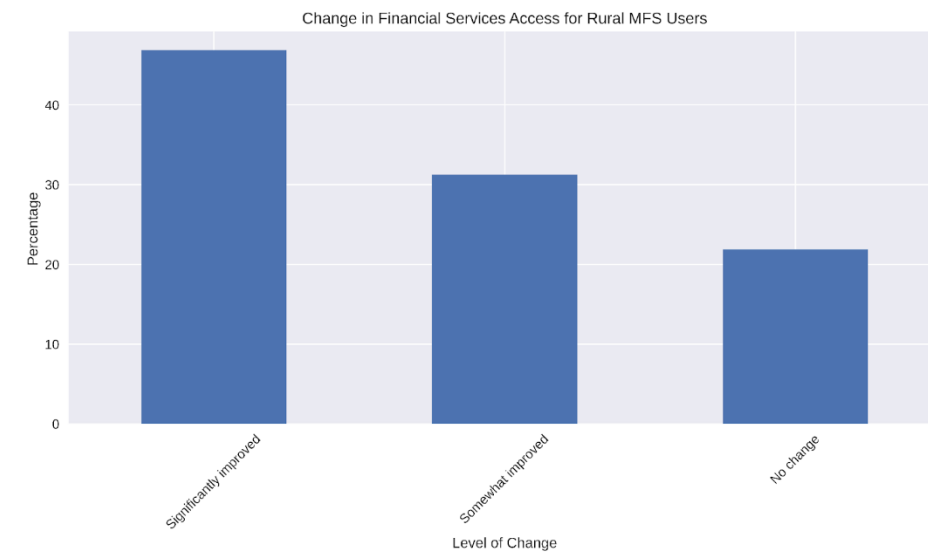


Fig 5: Change in Financial Services Access for Rural MFS Users

We conducted a one-sample t-test to determine if the proportion of rural MFS users reporting improved access (either significantly or somewhat) is significantly different from 50%.

One-sample t-test results:

- **t-statistic:** 3.787950821825889
- **p-value:** 0.0006561534787038849
- Effect size (Cohen's d): 0.6696214282285604

The t-test results show a statistically significant difference ( $p\text{-value} < 0.05$ ), indicating that the proportion of rural MFS users reporting improved access is significantly higher than 50%. The effect size (Cohen's d) of 0.67 suggests a medium to large effect.

These results indicate that Mobile Financial Services have had a positive impact on financial inclusion for the rural population in Bangladesh, with a significant majority reporting improved access to financial services.

### Hypothesis 2:

Null Hypothesis (H<sub>0</sub>): The usage of Mobile Financial Services (MFS) is not higher among previously unbanked populations compared to those who already had access to traditional banking services.

Alternative Hypothesis (H<sub>a</sub>): The usage of Mobile Financial Services (MFS) is higher among previously unbanked populations compared to those who already had access to traditional banking services.

First, let's look at the MFS usage rates for previously banked and unbanked populations:

	Uses_MFS
Had_Bank_Access	
0	0.6875
1	0.9166666666666666

Fig 6: Bank Account Access for MFS Users

These statistics show that:

- 68.75% of previously unbanked individuals use MFS
- 91.67% of previously banked individuals use MFS

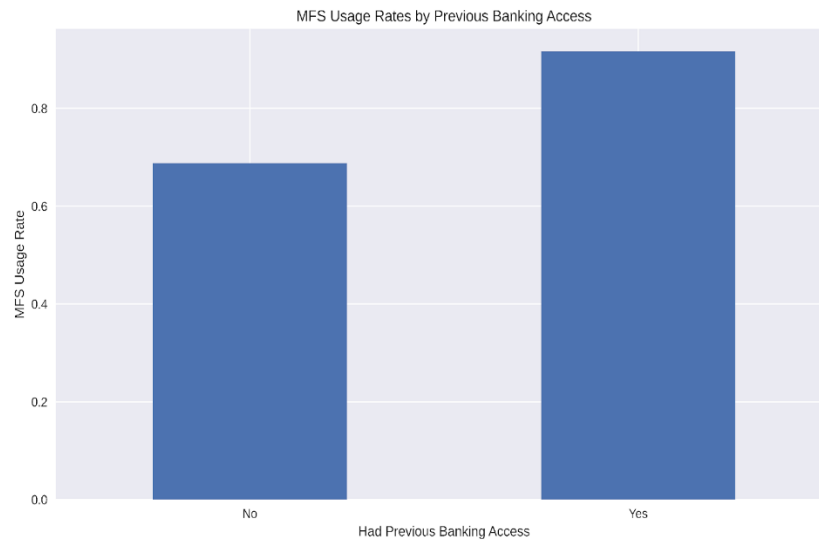


Fig 7: MFS Usage Rates by Previous Banking Access

Contrary to our hypothesis, the data suggests that MFS usage is actually higher among those who had previous access to banking services.

We used a two-sample t-test to compare the means of two independent groups (previously banked and unbanked). This test helps us determine if there's a significant difference in MFS usage between these groups.

Two-sample t-test Results:

- **t-statistic:** -6.164383698126853
- **p-value:** 1.7226761556239027e-09
- **Effect size (Cohen's d):** -0.6592054966339806

The negative t-statistic (-6.16) indicates that the mean MFS usage for the unbanked group is lower than for the banked group. The p-value is extremely small ( $1.72e-09 < 0.05$ ), suggesting strong evidence against the null hypothesis of no difference between the groups. The effect size (Cohen's d) of -0.66 indicates a medium to large effect, with the negative sign confirming that the unbanked group has lower MFS usage.

We will use the chi-square test to examine the relationship between two categorical variables (previous banking access and MFS usage). This test helps us determine if there's a significant association between these variables.

Chi-square test results:

- Chi-square statistic: 33.17123408414607
- **p-value:** 8.438976283492485e-09
- **Cramer's V:** 0.28654321674010624

The chi-square statistic (33.17) and very small p-value ( $8.44e-09 < 0.05$ ) indicate a significant association between previous banking access and MFS usage. Cramer's V (0.29) suggests a moderate effect size, confirming the strength of this association.

Based on the descriptive statistics and hypothesis tests, we must reject the hypothesis H2. The data provides strong evidence that the usage of Mobile Financial Services is actually higher among populations who already had access to traditional banking services compared to previously unbanked populations.

Key findings:

- MFS usage is higher among previously banked individuals (91.67%) compared to previously unbanked individuals (68.75%).
- The difference in MFS usage between these groups is statistically significant ( $p < 0.05$  in both t-test and chi-square test).
- The effect sizes (Cohen's d and Cramer's V) indicate a moderate to strong relationship between previous banking access and MFS usage.

These results suggest that while MFS is contributing to financial inclusion by reaching previously unbanked populations, it is even more widely adopted by those who already had access to traditional banking services. This could indicate that MFS is complementing rather than replacing traditional banking services, or that those with previous banking experience are more likely to adopt new financial technologies.

### Hypothesis 3:

Null Hypothesis (H0): Mobile Financial Services (MFS) have not reduced the gender gap in financial inclusion in Bangladesh

Alternative Hypothesis (H1): Mobile Financial Services (MFS) have reduced the gender gap in financial inclusion in Bangladesh.

Let's look at the financial inclusion by gender:

	Has_Bank_Account	Uses_MFS
Female	0.7291666667	0.7760416667
Male	0.8388625592	0.9099526066

Fig 8: Gender Differences in Bank Account Ownership and MFS Usage

This data shows that:

- 72.92% of females have a bank account, compared to 83.89% of males.
- 77.60% of females use Mobile Financial Services (MFS), compared to 91.00% of males.

We can visualize this data in the following graph:



Fig 9: Gender Differences in Financial Inclusion

We can see there is still a gender gap in both traditional banking and MFS usage. The gap appears to be slightly larger for MFS usage compared to bank account ownership. Both genders have higher participation in MFS than traditional banking.

We used Chi-square tests to examine the relationship between gender and financial inclusion:

Chi-square test results for Gender and MFS Usage:

- Chi-square statistic: 12.838033119255345
- **p-value:** 0.00033964444667079676
- **Cramer's V:** 0.1784829448049352

Chi-square test results for Gender and Bank Account Ownership:

- Chi-square statistic: 6.567609927414819
- **p-value:** 0.010385132431268857
- **Cramer's V:** 0.1276589159727281

If we analyze the perception of MFS impact on women's financial inclusion:

	count
<b>Do you think Mobile Financial Services have made financial services more accessible for women in your community?</b>	
Agree	66.25310173697271
Strongly agree	24.56575682382134
Neutral	8.188585607940446
Strongly disagree	0.49627791563275436
Disagree	0.49627791563275436

Fig 10: Perceptions on Mobile Financial Services Accessibility for Women

We can interpret that the vast majority of respondents (90.82%) either agree or strongly agree that MFS has made financial services more accessible for women in their community. Only a small percentage (0.50%) disagree or strongly disagree with this statement. This indicates a strong positive perception of MFS's impact on women's financial inclusion.

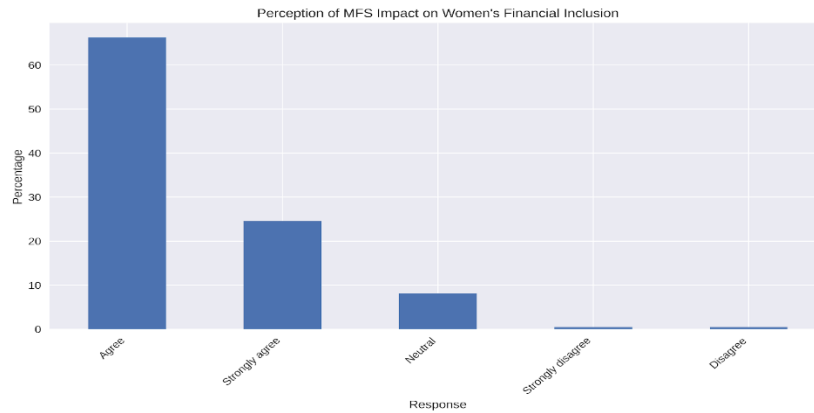


Fig 11: Perception of MFS Impact on Women's Financial Inclusion

Based on this analysis, we can conclude there is still a gender gap in both traditional banking and MFS usage, with men having higher participation rates in both services. and contrary to our initial hypothesis, the gender gap appears to be slightly larger for MFS usage compared to traditional banking. This is evidenced by the larger difference in usage percentages (13.4% for MFS vs. 11% for bank accounts) and the higher Chi-square statistic and Cramer's V value for MFS usage

Despite the persistent gender gap, MFS has increased overall financial inclusion for both genders. Both men and women have higher participation rates in MFS compared to traditional banking. There is a very positive perception of MFS's impact on women's financial inclusion, with over 90% of respondents agreeing that it has made financial services more accessible for women.

While MFS has not reduced the gender gap in financial inclusion as hypothesized, it has significantly improved overall financial inclusion. The strong positive perception suggests that MFS is seen as a valuable tool for improving women's access to financial services, even if it hasn't yet closed the gender gap.

#### 4.1.2 Result

The data shows that approximately 43.84% of the rural population uses Mobile Financial Services (MFS). Among these users, 46.88% reported significantly improved access to financial services, while 31.25% reported somewhat improved access. This indicates that MFS has positively impacted financial inclusion in rural areas by making financial services more accessible. Contrary to the initial hypothesis, MFS usage is higher among individuals who previously had access to traditional banking services (91.67%) compared to those who were unbanked (68.75%). This

suggests that MFS is more widely adopted by those already familiar with financial services, possibly complementing their existing banking activities. There is still a noticeable gender gap in both traditional banking and MFS usage, with men having higher participation rates. For example, 72.92% of females have a bank account compared to 83.89% of males, and 77.60% of females use MFS compared to 91.00% of males. Despite the gender gap, MFS has increased overall financial inclusion for both genders. Both men and women have higher participation rates in MFS compared to traditional banking, indicating that MFS is helping to bridge the gap to some extent. This could be due to the dual exposure to both traditional banking and MFS, leading to a higher overall count of reported barriers.

## **4.2 Discussion**

The findings of the study explain that the MFS has significantly improved the financial inclusion process in the rural areas of Bangladesh. More than 43.84% of the rural participants are those who acknowledge MFS being a part of their financial services, and 46.88% of them users experiencing significantly improved access to financial service and 31.25% of these are the users in the middle range thus reported moderate improvements. This aligns with previous research suggests MFS plays a critical role in extending financial services to rural populations that are underserved by traditional banks [13]. The findings suggest MFS has helped overcome barriers such as geographic isolation and the lack of banking infrastructure, consistent with the theoretical framework proposed by Aker-Mbiti (2010). In direct contrast to the second hypothesis, MFS usage is much higher in groups that are already in the formal banking system. 68.75% of the previously unbanked had ever used MFS compared to 91.67% for the previously banked. Although MFS has promoted financial inclusion, this channel is primarily adopted by users who already have knowledge of financial products and services. This result is in line with findings by Jack and Suri (2014), who suggest that prior exposure to banking can help in the adoption of MFS. From the third hypothesis, the findings reveal that though MFS has promoted financial inclusion among females, the gap between genders is still very huge. 77.60% of females reported using MFS, while 91.00% of males did, indicating that even now, men are more likely to use MFS than women. These findings are therefore consistent with the existing literature, which points to socio-cultural barriers, lower levels of financial literacy, and limited access to mobile phones as key factors that explain the gender gap in financial inclusion [2]. The persistent disparity suggests that MFS has not fully succeeded

in closing the gender gap, even though it has provided women with greater access to financial services than traditional banking methods. This finding aligns with research suggesting that technological interventions, while important, are insufficient to fully eliminate the gender gap in financial access [15]

These results only go to demonstrate that even while MFS has tremendous potential in empowering financial inclusion, access is usually limited in very excluded sections, especially unbanked and female clients. These findings indicate that those who can adapt more easily to the use of MFS services already have previous exposure to basic concepts in financial literacy or had been clients of banking institutions through their conventional systems; thus, strategic efforts need to be laid out in the expansion of MFS toward excluded sections.

This is a very limited study as it is focused on one geographic area, Savar Upazila, and thus may not represent the entire rural area of Bangladesh. Also, self-reported information may be subject to bias, and there is no deeper exploration of the underlying socio-cultural factors.

Further research is also needed on factors that hamper the adoption of MFS among unbanked and female populations, focusing on such aspects as digital literacy and trust in mobile financial platforms. Studies that place the impact of MFS in the context of long-term financial inclusion, especially beyond these areas of Bangladesh, would put the impacts of MFS into better perspective.

## CHAPTER 5

# IMPACT ON SOCIETY, ENVIRONMENT, AND SUSTAINABILITY

### 5.1 Impact on Society

The rise of Mobile Financial Services (MFS) has proved to be the most primary transformation in Bangladesh that is a good response to the specific needs of the underprivileged. MFS has been the power to bridge the gap of financial inclusion in the people's live by way of it that the previously unbanked population gaining access to necessary services. However, the main thing which has significantly helped the people is saving, sending remittances, and managing finances better than ever. Specifically, the rural users who took up the MFS revealed that the expansion of their financial services access was a tremendous achievement over the overreliance on the traditional banking systems.

**Economic Empowerment:** MFS has given the small entrepreneurs and the informal workers the power to mobilize easy and affordable financial solutions. economic interaction and micro-investments have seen good time thus far. Also, the users have access to tools that have led them to be more active participants in the formal economy, which, in turn, has prompted economic resilience, particularly in rural and underserved areas.

**Reduction in Gender Disparities:** MFS has indeed played a key role in narrowing the gender gap to some extent, but the picture of what women are really facing in terms of financial inclusion remains grim, being they are being cut off not only from MFS usage but also from traditional banking. The positive side of MFS is that it helps women, who otherwise are not financially capable, to overcome barriers of distance and lack of infrastructure to access financial services, and this is even the case in the said conservative rural societies. Initiatives concentrating on women's digital literacy and social mindfulness are very important to this end.

**Challenges:** The social impact of mobile financial services has become a serious problem due to the issues of digital illiteracy and the lack of trust people have in technology. The service is often

swamped by several technical problems and a fear of fraud among the users, thus making transparency and consumer protection a priority. Also, the swift introduction of mobile financial services has brought dual dependence on conventional banks as well as mobile platforms to live, therefore, measures and guiding principles should be applied to properly navigate this issue.

## **5.2 Impact on Environment**

MFS poses a green alternative to traditional banking, contributing to ecological sustainability through the reduction of physical infrastructure. MFS makes it possible for people to carry out financial transactions through their phones, thus MFS decreases paper-based processes usage and the energy needed to run and maintain physical bank branches.

**Carbon Footprint Decrease:** The digitalization of financial services has been the case of lowering the carbon footprint traditional financial institutions are producing. Traditional banking has been linked with resource-heavy operations including physical transaction transportation and large office space sustenance over the years. While MFS shrinks the necessity of these, it allows for a more environmentally friendly, green, and sustainable process to occur.

**Electronic Waste Threatening Factors:** MFS causes less pollution in certain areas, but overdependence on mobile devices and digital infrastructure is a cause of concern regarding electronic waste. Promoting the thought of recycling and careful disposal of electronic waste is vital to lessening the environmental hazards that would otherwise occur.

## **5.3 Ethical Aspects**

Dimensions of moral MFS adoption by the community are the real deal problems such as inclusivity, data security, and equitable access. Even though MFS technologies have allowed more people to use the digital finance services, yet still there are some ethical issues that must be addressed:

**Equitable Access:** MFS definitely had a positive effect on the inclusion of marginalized sections of the society, however, digital inequality in terms of gender-based and skills gap is a much larger

problem to be solved. Women and older groups are often receiving additional obstacles; therefore, it is ethical for policymakers and service providers to create programs that are targeted.

**Privacy and Data Security:** The explanation of the type of data that are collected and the way it is used by the MFS platforms requires the strict compliance with ethical standards. Some users are worried about that the misuse of data and the occurrence of frauds may be likely, which makes it clear the need for strong data protection laws and trustworthy practices to establish a good environment with customers.

**Ethical Use of Technology:** The MFS operator is supposed to be not only ambitious in the technological developments but also a supporter of ethics by not forgetting the vulnerable groups. Solving the accessibility problem of low-income groups and training people in digital skills are part of the equitable service delivery.

#### **5.4 Sustainability Plan**

For MFS to be sustainably used as a tool for financial inclusion, a detailed multidimensional method needs to be employed:

**Policy Development:** Government will have to develop administrative policies that do not stifle development while ensuring the full protection of consumers' interests. Simple licensing procedures, which remove the limitations of competition and facilitate the creation of rural-centered innovations, can further ensure MFS sustainability.

**Technological Investments:** An improved mobile infrastructure and digitized platforms will go a long way in making the internet more accessible, and will be due to tech investments. As a result, technical difficulties will be eliminated, and the MFS reliability will be increased, enabling every user to get their services without fail.

**Digital Literacy Programs:** Modified digital literacy programs that impart knowledge to individuals (especially women and residents of rural areas) on how to engage with such platforms will go a long way in achieving this goal. Private-public partnerships can be instrumental in realizing the objectives of these programs.

**Environmental Initiatives:** Operators are expected to adopt sustainable measures by green initiatives such as encouraging the recycling of devices and reducing the electronic waste. Ecological sustainability criteria to be applied in MFS operations will be critical for corporate eco-responsibility.

**Monitoring and Evaluation:** Consistent evaluations of MFS's impact on society, nature, and the economy will be a chance for the implementation of new practices. The policies should be revised and technology upgraded based on the feedback from users across all demographic groups, so that MFS remained an adequate and sustainable solution.

## **CHAPTER 6**

### **CONCLUSION AND FUTURE RESEARCH**

#### **6.1 Summary of the Study**

This study analyzed the role of Mobile Financial Services (MFS) in enhancing financial inclusion in Bangladesh, with a focus on rural and marginalized populations. The research revealed that MFS significantly improves access to financial services, particularly in rural areas, by overcoming infrastructural barriers. However, MFS adoption was found to be higher among individuals already integrated into the formal banking system, highlighting its complementary role. Persistent gender disparities and significant technical challenges were noted, with digital literacy and trust being major barriers for effective adoption. Despite these challenges, MFS has made meaningful progress in advancing financial inclusion and fostering economic participation.

#### **6.2 Conclusions**

The paper aims to discuss on the role of Mobile Financial Services (MFS) that help in enhancing the status of people's financial inclusion in Bangladesh. Consequently, from the empirical research it can be suggested that MFS has been beneficial in managing to provide service to the unserved and underbanked population especially in the rural areas. This data shows that MFS usage participation rates among both sexes are higher compared to traditional banking but with some level of disparity between the two genders

Nevertheless, the technology issues described by the users have allowed for more extended and diverse economic participation through the provision of safe and accessible financial services. The government of Bangladesh through its central bank, Bangladesh Bank has put in place measures and standards that have encouraged the emergence and use of MFS For MFS to embrace its full potential to narrow the gap for financially excluded persons, specific approaches to support digital literacy, security, and gender prospects should be developed. As for the suggestions for future research, more studies should be conducted to investigate the socio-economic impacts on various demographic groups and to determine the best approaches to improve financial inclusion with the help of MFS at the population level.

### 6.3 Implication for Further Study

Future research should focus on the technological gaps and trust issues that hinder the widespread adoption of MFS in rural areas. While MFS provides a viable solution to financial exclusion, many rural users struggle with basic technological literacy, limiting their ability to fully utilize digital platforms. Challenges such as limited familiarity with mobile interfaces, lack of user-friendly tools, and inadequate digital infrastructure exacerbate the problem.

Trust issues further compound the situation, as many rural users are skeptical about the security and reliability of MFS platforms. Concerns over fraud and technical failures discourage adoption and limit user engagement.

To address these issues, future studies could investigate the following:

- **Digital Literacy Programs:** Assess the impact of structured training programs aimed at improving technological competence among rural users.
- **Simplified Interfaces:** Explore how designing user-centric, intuitive MFS platforms can enhance usability and adoption rates.
- **Building Trust:** Examine strategies to improve trust in MFS, such as transparent policies, fraud prevention measures, and customer support systems.
- **Infrastructure Analysis:** Investigate the role of digital infrastructure, including mobile network reliability and accessibility, in bridging the technological gap.

Research into these areas will provide valuable insights for policymakers and service providers, enabling them to create more inclusive and effective MFS solutions tailored to the needs of rural populations.

### 6.4 Policy Recommendation

One of the main barriers to embracing of MFS is illiteracy that is more prevalent among users in rural areas. Some potential users have no prior experience using mobile technology and hence do not fully comprehend the working of the MFS platforms, particularly women and the elderly. It is suggested that the government and the financial institutions should devise specific professional

trainings which focus on practice on engaging mobile financial services. Such programs should ideally be designed to fit into specific categories such as the rural people and women. The barrier that was mentioned most frequently by the MFS users clarified that there is still the need to refine the efficiency and usability of MFS platforms by pointing to the choice of “Technical issues.” It is also important that financial institutions need to invest in developing the technological strength to enable that MFS platforms are well secured and user friendly. This involves challenges like the negative network signals, graphical interface, and the failure of transactions. Further, there is also a need to provide the service to the financial service providers to support their customers, where the users are struggling and stuck with some technical issues on the platforms. Currently, MFS has played a role in enhancing the financial rates for women but gender disparity still persists. In this regard, female-policy makers should come up with policies that will enhance the participation of women on MFS. This may entails using monetary incentives to encourage women to sign up for MFS accounts, developing financial products services for women, or launching crusade rallies that popularize MFS among women. More information has to be collected on how to increase the use of MFS by women since shortage of mobile phones is among the key drivers that encourage the use of MFS. To be able to take advantage of MFS, many people have the feeling that their transactions would not be secure and private. To increase user trust in MFS the implementing organisations should enforce strict security measures, including the use of passwords accompanied by other secondary features like two step verification or encrypted user data. Also, MFS providers should also clearly explain to the users how the data of the users will be utilized and how their privacy will be protected. There should also be public awareness to create demand for MFS by informing the users on the secures features of the MFS platforms and those that they may be afraid of falling victims to fraud or data theft. To encourage greater collaboration among the key players and to boost MFS usage among the citizenry, especially within rural areas, policymakers ought to ensure the availability of the required physical infrastructure underlying the MFS provision. This include expanding accessibility and availability of mobile networks in some rural regions and providing affordable mobile phones to the people in those regions. Also, there is a need for the financial service providers to reduce the transaction fee for what they charge the rural users to encourage the use of MFS in the areas.

## REFERENCES

- [1] N. Akhter and M. A. B. Khalily, “Impact of Mobile Financial Services on Financial Inclusion in Bangladesh,” 2017.
- [2] A. Demirgüç-Kunt, L. Klapper, D. Singer, S. Ansar, and J. Hess, “The Global Findex Database Measuring Financial Inclusion and the Fintech Revolution Asli The Global Findex Database,” 2018.
- [3] M. F. Hasan and K. R. Mahmud, “The Perspective of Mobile Financial Services as a sustainable tool of Financial Inclusion to the economy of Bangladesh: An exploratory Study,” 2023. [Online]. Available: [www.ijarst.com](http://www.ijarst.com)
- [4] M. F. Rahman, “The future of mobile financial services in Bangladesh.,” The Daily Star. Accessed: Jul. 04, 2024. [Online]. Available: <https://www.thedailystar.net/supplements/mobile-financial-services/news/the-future-mobile-financial-services-bangladesh-2028885>
- [5] A. Aziz and U. Naima, “Rethinking digital financial inclusion: Evidence from Bangladesh,” *Technol Soc*, vol. 64, Feb. 2021, doi: 10.1016/j.techsoc.2020.101509.
- [6] N. A. Sarpong and M. Agbeko, “Optimizing Technology in Mobile Financial Services: User experiences and expectations in Ghana,” *Int J Comput Appl*, vol. 177, no. 39, pp. 1–7, Feb. 2020, doi: 10.5120/ijca2020919716.
- [7] M. K. Mujeri and S. Azam, “Role of Digital Financial Services in Promoting Inclusive Growth in Bangladesh: Challenges and Opportunities,” 2018.
- [8] D. Afroze and F. I. Rista, “Mobile financial services (MFS) and digital inclusion – a study on customers’ retention and perceptions,” *Qualitative Research in Financial Markets*, vol. 14, no. 5, pp. 768–785, Sep. 2022, doi: 10.1108/QRFM-06-2021-0095.
- [9] K. Donovan, *Mobile Money for Financial Inclusion*, vol. 61(1). 2012.
- [10] N. Akhter and M. A. B. Khalily, “An Analysis of Mobile Financial Services and Financial Inclusion in Bangladesh,” *Indian Journal of Human Development*, vol. 14, no. 2, pp. 213–233, Aug. 2020, doi: 10.1177/0973703020946706.
- [11] Bangladesh Bank, “An Impact Study on Mobile Financial Services (MFSs) in Bangladesh,” 2017. Accessed: Jul. 04, 2024. [Online]. Available: [https://www.bb.org.bd/pub/special/impact\\_mfs\\_27092018.pdf](https://www.bb.org.bd/pub/special/impact_mfs_27092018.pdf)
- [12] N. P. Rana, S. Luthra, and H. R. Rao, “Key challenges to digital financial services in emerging economies: the Indian context,” *Information Technology and People*, vol. 33, no. 1, pp. 198–229, Jan. 2020, doi: 10.1108/ITP-05-2018-0243.

- [13] J. C. Aker and I. M. Mbiti, “Mobile phones and economic development in Africa,” *Journal of Economic Perspectives*, vol. 24, no. 3, pp. 207–232, Jun. 2010, doi: 10.1257/jep.24.3.207.
- [14] W. Jack and T. Suri, “Risk sharing and transactions costs: Evidence from Kenya’s mobile money revolution,” *American Economic Review*, vol. 104, no. 1, pp. 183–223, Jan. 2014, doi: 10.1257/aer.104.1.183.
- [15] Asian Development Bank, “Gender Equality and Social Inclusion Diagnostic for the Finance Sector of Bangladesh,” International, Dec. 2022. doi: 10.22617/TCS220566-2.
- [16] T. Beck, A. Demirgüç-Kunt, and M. S. Martinez Peria, “Banking Services for Everyone? Barriers to Bank Access and Use around the World,” *World Bank Econ Rev*, vol. 22, no. 3, pp. 397–430, Jan. 2008, doi: 10.1093/wber/lhn020.
- [17] World Bank, “Financial Inclusion,” World Bank. Accessed: Jul. 04, 2024. [Online]. Available: <https://www.worldbank.org/en/topic/financialinclusion/overview>
- [18] I. Mbiti and D. N. Weil, *Mobile banking: The impact of M-PESA in Kenya*. University of Chicago Press, 2016. Accessed: Jul. 04, 2024. [Online]. Available: <http://www.nber.org/chapters/c13367>
- [19] I. Mas and D. Radcliffe, *Mobile Payments Go Viral: M-PESA in Kenya*. The World Bank, 2011. Accessed: Jul. 04, 2024. [Online]. Available: [https://books.google.com.bd/books?hl=en&lr=&id=4LlaYqIyAWAC&oi=fnd&pg=PA353&dq=Mobile+Payments+Go+Viral:+M-PESA+in+Kenya&ots=DWEpG8fycF&sig=aUIBn25wJ7cK8bfBtKSnOcv94pU&redir\\_esc=y#v=onepage&q=Mobile%20Payments%20Go%20Viral%3A%20M-PESA%20in%20Kenya&f=false](https://books.google.com.bd/books?hl=en&lr=&id=4LlaYqIyAWAC&oi=fnd&pg=PA353&dq=Mobile+Payments+Go+Viral:+M-PESA+in+Kenya&ots=DWEpG8fycF&sig=aUIBn25wJ7cK8bfBtKSnOcv94pU&redir_esc=y#v=onepage&q=Mobile%20Payments%20Go%20Viral%3A%20M-PESA%20in%20Kenya&f=false)
- [20] R. Mazer and P. Rowan, “Competition in mobile financial services: Lessons from Kenya and Tanzania,” *AJIC*, 2016. [Online]. Available: <http://creativecommons.org/licenses/by/4.0>
- [21] Bangladesh Bank, “Policy Paper Mobile Financial Services in Bangladesh: An Overview of Market Development 1,” 2012. Accessed: Jul. 04, 2024. [Online]. Available: <https://www.bb.org.bd/pub/research/policypaper/pp072012.pdf>
- [22] Bangladesh Bank, “Bangladesh Mobile Financial Services (MFS) Regulations,” 2022. Accessed: Jul. 04, 2024. [Online]. Available: <https://www.bb.org.bd/mediaroom/circulars/psd/feb152022psd04e.pdf>
- [23] A. C. Paelo, “The Competitive Dynamics and Regulation of Mobile Money Services in Kenya and Uganda,” 2022.

## MFS Inclusion

### ORIGINALITY REPORT

9%

SIMILARITY INDEX

6%

INTERNET SOURCES

5%

PUBLICATIONS

6%

STUDENT PAPERS

### PRIMARY SOURCES

1	Submitted to Daffodil International University Student Paper	2%
2	David Mhlanga, Mufaro Dzingirai. "Financial Inclusion and Sustainable Development in Sub-Saharan Africa", Routledge, 2025 Publication	2%
3	Submitted to Higher Education Commission Pakistan Student Paper	1%
4	<a href="https://dspace.daffodilvarsity.edu.bd:8080">dspace.daffodilvarsity.edu.bd:8080</a> Internet Source	1%
5	"E-Financial Strategies for Advancing Sustainable Development", Springer Science and Business Media LLC, 2024 Publication	1%
6	Hafinaz, R Hariharan, R. Senthil Kumar. "Recent Research in Management, Accounting and Economics (RRMAE) - A case study on Recent Research in Management, Accounting and Economics", Routledge, 2025 Publication	1%