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# Determinants influencing the adoption of mobile banking by women in Bangladesh

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## Abstract

Women's mobile banking adoption is linked to several advantages, including empowering women, enhancing investment in women-owned businesses, and decreasing extreme poverty. This study explores the demographic and socioeconomic characteristics that affect women's mobile banking adoption in Bangladesh using Bangladesh Demographic and Health Surveys (DHS; 2020) data. In this study, 12,147 ever-married women aged 15-49 are included in the analysis. The chi-square test is used to examine the effect of socioeconomic and demographic factors on women's mobile banking adoption. Then, the enter method of a binary logistic regression model is applied to identify the factors most strongly affiliated with it. The result shows that 14.8% (urban = 15.1% and rural = 14.6%) of women have adopted mobile banking services. The regression model reveals that women's mobile banking adoption is significantly related to their age, education and occupation, husband's education and occupation, livestock ownership, media exposure, and region. Women's mobile banking adoption increased gradually with the increasing educational attainment of women. The study mentions that the Chi-square test of independence depicts a significant association between socioeconomic status and women's mobile banking adoption, but the regression model shows an insignificant relationship between them. Respective banks should design their products and services to be more customer-friendly for people of different ages, education, professions, and geographical locations, especially women, and design push-pull services in the local Bengali language so that different levels of people, especially women, can understand. A future study can be done to address all demographic and socioeconomic characteristics that affect women's mobile banking adoption.

## Keywords

mobile banking adoption, demographic and socioeconomic factors, logistic regression analysis

## Revisions

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# Determinants Influencing the Adoption of Mobile Banking by Women in Bangladesh

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## Abstract

Women's mobile banking adoption is linked to several advantages, including empowering women, enhancing investment in women-owned businesses, and decreasing extreme poverty. This study explores the demographic and socioeconomic characteristics that affect women's mobile banking adoption in Bangladesh using Bangladesh Demographic and Health Surveys (DHS; 2020) data. In this study, 12,147 ever-married women aged 15-49 are included in the analysis. The chi-square test is used to examine the effect of socioeconomic and demographic factors on women's mobile banking adoption. Then, the enter method of a binary logistic regression model is applied to identify the factors most strongly affiliated with it. The result shows that 14.8% (urban = 15.1% and rural = 14.6%) of women have adopted mobile banking services. The regression model reveals that women's mobile banking adoption is significantly related to their age, education and occupation, husband's education and occupation, livestock ownership, media exposure, and region. Women's mobile banking adoption increased gradually with the increasing educational attainment of women. The study mentions that the Chi-square test of independence depicts a significant association between socioeconomic status and women's mobile banking adoption, but the regression model shows an insignificant relationship between them. Respective banks should design their products and services to be more customer-friendly for people of different ages, education, professions, and geographical locations, especially women, and design push-pull services in the local Bengali language so that different levels of people, especially women, can understand. A future study can be done to address all demographic and socioeconomic characteristics that affect women's mobile banking adoption.

**Keywords:** mobile banking adoption, demographic and socioeconomic factors, logistic regression analysis

## Introduction

Mobile banking is an innovative idea in the banking sector (Srivastava, 2013). This revolution has significantly changed the way banking transactions are conducted. It offers a more accessible, swift, and flexible alternative to traditional internet banking services, such as point-of-sales and ATMs (Agwu & Carter, 2014). Mobile banking is becoming more popular for a variety of reasons, including:

- widespread smartphone use,
- extensive mobile network coverage (Khan et al., 2019),
- enhanced convenience (Khan et al., 2019),

- user-friendliness (Alalwan et al., 2015), and
- the ability to access banking services anytime and anywhere (Lee & Chung, 2009).

The mobile banking system, compared to conventional banking, allows bank customers to conduct financial activities without needing to visit a bank branch, enhancing the account holder's efficiency by saving time and reducing space constraints (Ahmed et al., 2011; Mishra & Sahoo, 2013). The banking industry's rapid development led to the swift adoption of mobile banking. Paybox, a German company in partnership with Deutsche Bank, pioneered the first mobile banking service in the late 1990s (Shaikh & Karjaluo, 2015). Initially, these services were provided via short message service (SMS) banking (Daniel, 1999). However, the rapid adoption of the Android operating system and other smartphones has improved the functionality with the introduction of apps which allow the account holder to conduct financial transactions with ease (Abayomi et al., 2019). Mobile banking service is widely used in both developed and developing countries like the United States (Engwanda, 2014), the United Kingdom (Slade et al., 2015), China (Yang et al., 2015), India (Roy et al., 2016), Pakistan (Glavee-Geo et al., 2017), Malaysia (Shanmugam et al., 2014), Iran (Mehrad & Mohammadi, 2016), and Bangladesh (Massally et al., 2022a).

Mobile banking is now an important part of mainstream financial services in many low- and middle-income countries. The *State of the Industry Report on Mobile Money 2023* reveals that registered mobile money accounts grew by 13% annually, from 1.4 billion in 2021 to 1.6 billion in 2022 (Global System for Mobile Communications Association [GSMA], 2023). This period has seen significant growth in the number of people engaging in digital payment transactions in developing countries. Specifically, there has been a notable increase of 13% points from 44% in 2017 to 57% in 2021 (Demirgüç-Kunt et al., 2022). According to a study by the International Market Analysis Research and Consulting Group (2024), the global mobile payment market size reached \$2,276 billion in 2023, with projections indicating it could reach \$9,821.4 billion by 2032, exhibiting a compound annual growth rate of 17.1% during the period 2024-2032. However, the adoption of mobile banking among women are lower compared to men (Demirgüç-Kunt et al., 2022; Zins & Weill, 2016). In low-and middle-income countries, women are 28% less likely than men to have a mobile banking account (Awanis & Shanahan, 2022). While substantial gains have been made in mobile-led financial inclusion recently, women's use of mobile money services still face barriers such as lack of education (Fall et al., 2020; GSMA, 2023), reduced labor force participation (Novo-Corti et al., 2014), and limited of mobile phone ownership, along with lack of awareness about mobile banking and digital and financial literacy (GSMA, 2023). Several studies have observed that women are less likely than men to adopt mobile banking services (Anane & Nie, 2022; Awanis & Shanahan, 2022; GSMA, 2023; Makanyeza, 2017; Singh et al., 2017).

Mobile banking is now well-recognized worldwide; however, it is rising faster in Bangladesh than in other countries due to the extension of mobile financial services (MFSs) and a strong market expansion (Massally et al., 2022a). The mobile banking market in Bangladesh has been expanding since 2011, where customers can use mobile banking more swiftly and effectively because of their embrace of e-commerce (Hoque et al., 2015). There were reports of increased speed arriving for mobile banking in Bangladesh in 2019. Since implementing lockdowns, MFS providers have seen substantial growth in requests for digital transactions. According to Khatun et al. (2021), more people registered to utilize mobile banking during the COVID-19 pandemic than ever before. Specifically, government regulations of various mobile banking transactions like cash in, cash out, person-to-person transactions, salary, utility bill payments, and so on played a vital role in an increase in people's access to digital financial services during COVID-19. Shifting habits toward digital

transactions have also aided in expanding their financial access (Khatun et al., 2021). As of 30 June 2023, nine banks, three subsidiary companies, and one digital financial service provider of the Bangladesh Postal Department–Nagad were providing MFSs (Bangladesh Bank, 2024). In Bangladesh, bKash has the largest market share among mobile banking services, followed by Rocket, SureCash, Nagad, M Cash, and Upay. According to the Bangladesh Telecommunication Regulatory Commission (2023), Bangladesh had a total of 190.81 million mobile phone subscribers at the end of December 2023. Currently, 83.75 million mobile banking accounts, out of 2,204.57 million registered accounts, are active through financial transactions until December 2023, resulting in a transaction total of 1245.48 billion Bangladeshi taka in December 2023 (Bangladesh Bank, n.d.). According to Bangladesh Bank’s Annual Report 2022-2023 (2024), the number of registered and active MFS clients increased by 16.23% and 11.88% respectively this fiscal year. The transaction number and volume were also increased by 32.05% and 39.97% respectively (Bangladesh Bank, 2024). Over the last five years, Bangladesh has witnessed a steep rise in financial inclusion; the Sustainable Development Goals Cell at the Bangladesh Bureau of Statistics suggests that 79% of adults are engaged in banking services, with one in five financial transactions happening digitally (Massally et al., 2022b).

Mobile banking awareness is much lower for women than men in Bangladesh (GSMA, 2023). According to *State of the Industry Report on Mobile Money 2023* (GSMA, 2023), women’s account ownership remained at 20% in 2022 from the year before while men’s account ownership increased from 41% in 2021 to 45% in 2022 (GSMA, 2023). The gender gap in mobile banking account ownership is 55% in Bangladesh as mobile ownership among men is growing at a faster pace than among women (GSMA, 2023), revealing an untapped market for commercial banks in Bangladesh. It suggests that commercial banks have a crucial role to play as conduits for enhancing financial inclusion.

To date, various studies on the adoption of mobile banking (Anane & Nie, 2022; Engwanda, 2014; Glavee-Geo et al., 2017; Hassan et al., 2014; Lee & Chung, 2009; Mamun et al., 2023; Mehrad & Mohammadi, 2016; Mitchell et al., 2024; Rasheduzzaman et al., 2021; Shanmugam et al., 2014; Singh et al., 2017; Slade et al., 2015; Teka & Sharma, 2017; Yang et al., 2015; Yao & Shanoyan, 2018; Zins & Weill, 2016) have concentrated on either developed or developing nations, with limited attention to the specific factors affecting women’s adoption of mobile banking. It is still difficult for both developing and developed countries to reach inaccessible people in the countryside without banking services. Only a few studies have identified the factors influencing the adoption of mobile banking in Bangladesh (Hassan et al., 2014; Khatun et al., 2021; Mamun et al., 2023; Rasheduzzaman et al., 2021), often focusing on customer satisfaction, and the growth, problems, and prospects of mobile banking services. Consequently, the literature regarding demographic and socioeconomic factors affecting the adoption of mobile banking, particularly among women, is lacking. This study aims to shed light on the characteristics that affect the adoption of mobile banking for women in Bangladesh, contributing valuable insights into this underexplored area.

### ***Objectives of the Study***

This study aims to investigate the demographic and socioeconomic characteristics that affect women’s mobile banking adoption in Bangladesh. The specific objectives are to:

- Examine the present scenario of women’s mobile banking adoption in Bangladesh, and
- Determine the demographic and socioeconomic factors influencing women’s mobile banking adoption in Bangladesh.

## **Literature Review**

This study reviews the literature on mobile banking adoption to explore the characteristics that influence mobile banking adoption to determine how the existing studies operationalize mobile banking adoption and reveal the connection between women's mobile banking adoption and demographic and socioeconomic factors. Mobile banking is more popular among younger people (Margaret & Ngoma, 2013). Younger people tend to adopt new concepts, services, and products relatively early (Lee et al., 2010). Several authors (Lohana & Roy, 2021; Margaret & Ngoma, 2013; Oladejo et al., 2016; Rasheduzzaman et al., 2021; Singh et al., 2017) found that the young-aged population is more trends to adopt mobile banking than the old generation. In contrary, the hypothesis tested to diagnose the relationship between age and adoption of mobile banking by several authors (Abayomi et al., 2019; Abdinoor & Mbamba, 2017; Fall et al., 2020; Kikulwe et al., 2014; Mbiti & Weill, 2016; Olaleye et al., 2022; Yitbarek & Zeleke, 2013) shows a continuing but steady decline in the percentage preference of mobile banking as the age group increases. Besides, age does not significantly affect mobile banking adoption (Dineshwar & Steven, 2013; Makanyeza, 2017; Ramdhony & Munien, 2013).

Educational level significantly influences the ideas of mobile banking adoption (Palani & Yasodha, 2012). Fall et al. (2020) mentioned that women have a lower tendency to adopt mobile banking because of their lower educational attainment. Several authors (Anane & Nie, 2022; Bhuvu, 2023; Fall et al., 2020; Kikulwe et al., 2014; Margaret & Ngoma, 2013; Mbiti & Weill, 2016; Murendo et al., 2015) mentioned that mobile banking adoption increased gradually with increasing education levels. According to Rasheduzzaman et al. (2021), more educated individuals used mobile payment services less frequently. Conversely, education is insignificant in mobile banking adoption (Abayomi et al., 2019; Makanyeza, 2017; Oladejo et al., 2016). A husband's education is crucial to women's decision-making autonomy (Bhandari et al., 2016). It may be assumed that the husband's education may influence women to adopt mobile banking.

Employment status is a potential determinant of women's decision-making autonomy in Bangladesh (Sen et al., 2018). Murendo et al. (2015) found that engaging in off-farm activities significantly influences mobile money adoption. Several authors (Abayomi et al., 2019; Marumbwa, 2014; Lohana & Roy, 2021) found that occupational level is significantly associated with mobile banking adoption. A husband's occupation is an important determinant of women's decision-making autonomy (Sen et al., 2018). It may be considered husband's occupation is an influencing factor in women's mobile banking adoption.

Higher-income people used mobile banking services more frequently (Rasheduzzaman et al., 2021). Lohana and Roy (2021), and Oladejo et al. (2016) illustrated that income is significantly influenced by mobile banking adoption. Nonetheless, Alafeef et al. (2011) revealed that income level is a negative influencing factor in mobile banking adoption level. Further, different studies showed that income level has no significant effect on mobile banking adoption (Annin et al., 2013; Teka & Sharma, 2017; Zeya, 2022). Socioeconomic status is another possible factor in women's decision-making autonomy (Bhandari et al., 2016; Sen et al., 2018). Different variables have been used to measure socioeconomic status in various studies. To measure socioeconomic status, this study used the wealth index constructed by the Bangladesh Demographic and Health Surveys (DHS) –the wealth index indicates disparities in households' characteristics in relation to the usage of health and other essential services, as well as health outcomes (DHS, 2020). Mbiti and Weill (2016) identified living standards and the physical environment of the household as the factors of mobile banking adoption.

Kikulwe et al. (2014) mentioned that mobile banking adoption is significantly influenced by wealth and asset ownership.

Livestock ownership is a factor that has received less attention in the study on mobile banking adoption. Farmers who receive payments from buyers using mobile banking services are more prone to sell their products at the town and district level rather than in middleman and village markets (Yao & Shanoyan, 2018). Media exposure is another factor that has received less attention in the study on mobile banking adoption. Media exposure is a potential determinant of women's decision-making autonomy in Bangladesh (Sen et al., 2018). Mass media communication is a fast and effective way to disseminate information about new technology (Fourt & Woodlock, 1960). Several authors (Shankar et al., 2020; Tam & Oliveira, 2017; Tran & Corner, 2016) noted that banks promote mobile banking using various media outlets to reach the untapped market of potential users of mobile banking.

Women's autonomy in decision-making may be influenced by their region (Sen et al., 2018). Choudhury and Bhattacharjee (2015) mentioned that the users' residence location influences the adoption of electronic banking. Anane and Nie (2022) depicted that region and urban-rural residences are significantly associated with digital financial services adoption. Rasheduzzaman et al. (2021) noted that people located in urban used mobile banking more frequently than people living in rural areas.

The studies discussed above have made a lot of contribution to information regarding the variables that effect the adoption of mobile banking in Bangladesh. However, a set of variables influencing the adoption of mobile banking in Bangladesh may be insignificant in other countries. The results might not be generalizable to other countries because of differences in culture, customs, economy, living standards, rules, and regulations.

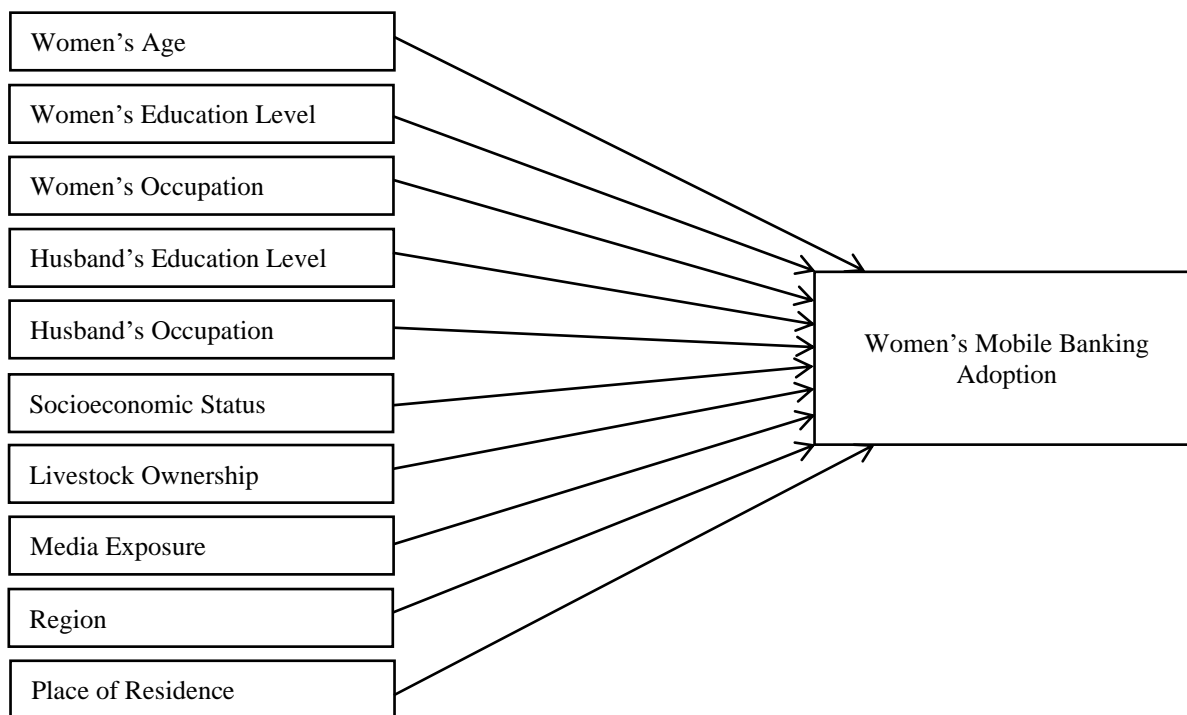
### ***Conceptual Model***

The objective of the study is to determine the association between demographic and socioeconomic factors and women's mobile banking adoption. With regard to existing theories and ideas in the literature examined it is evident that there are certain factors responsible for the adoption of mobile banking. In order to explore this association, women's mobile banking adoption is taken as the dependent variable and women's age, education, and occupation; husband's education and occupation; socioeconomic status; livestock ownership; media exposure; region and place of residence are selected as the independent variables. Based on the existing theories and ideas in literature, the study formulated a comprehensive conceptual model for this study is shown in Figure 1.

### **Methods**

#### ***Source of Data***

The study analyzed the data collected from the Bangladesh DHS (2020), which was executed by Mitra and Associates, Dhaka, under the authority of the National Institute of Population Research and Training, Ministry of Health, and Family Welfare. The dataset is free to download from the DHS (n.d.) program website. Bangladesh DHS (2020) surveyed both rural and urban areas and gathered information regarding households, demographics, socio-economic, women's status, access to services, etc.

**Figure 1.** The Conceptual Model for Determining Factors Affecting Women’s Mobile Banking Adoption

### *Sampling Design and Sample Size*

Bangladesh DHS (2020) gathered data by interviewing 15-54 aged men and 15-49 aged ever-married women using two-stage stratified random sampling. The research was grounded on a two-stage stratified household sample. In the first stage, 675 enumeration areas (EAs; urban = 250 and rural = 425) were chosen with the probability proportional to the EA size. To provide a sampling frame for the second stage selection of households, a comprehensive household listing operation was then carried out in all the chosen EAs. In the second stage, an average systematic sample of 30 households was chosen per EA to provide statistically compatible estimates of vital demographic and health characteristics for the country overall, for rural and urban areas separately, and for each of the eight divisions. With this design, the survey chose 20,250 residential households to conduct. Finally, 19,457 (urban = 7,103 and rural = 12,354) households were surveyed. Further, in Bangladesh DHS (2020), a total of 20,127 (urban = 7,374 and rural = 12,753) ever-married women aged 15-49 were interviewed from 16,651 households out of 19,457 surveyed households. Out of those 20,127 women, 12,149 (urban = 5,086 and rural = 7,063) women have mobile phone ownership. Finally, this study selected 12,147 (urban = 5,085 and rural = 7,062) women to analyze women’s mobile banking adoption because of missing information. Information regarding mobile banking adoption is obtained from 12,147 (urban = 5,085 and rural = 7,062) ever-married women aged 15-49. The data shows that only 14.8% (urban = 15.1% and rural = 14.6%) women have adopted mobile banking, and the remaining 85.2% (urban = 84.9% and rural = 85.4%) women have not adopted mobile banking services. Among the women who adopted mobile banking, 93.6% are married and 6.4% are either withdrawer, divorced, or separated. Again, among the women who did not adopt mobile banking, 94.1% are married and 5.9% are either withdrawer, divorced, or separated. A detailed description of the sampling design for the Bangladesh DHS (2020) is available elsewhere.



## Variables

### Dependent Variable

In this study, the dependent variable is sourced from the Bangladesh DHS (2020) questions regarding women's mobile banking adoption. This question was asked to 15-49-year-old ever-married women in the DHS (2020): *Do you use your mobile phone for any financial transactions?* with two categories (yes and no). So, a binary dependent variable; *women's mobile banking adoption* is created with two categories, 1 = yes if a woman is currently adopting mobile banking services and 0 = no if a woman is not currently adopting mobile banking.

### Independent Variables

Based on the review of previous studies on the determinants of mobile banking adoption, the study includes some explanatory variables to determine the characteristics influencing women's mobile banking adoption. The explanatory variables are women's age, education, and occupation; husband's education and occupation; socioeconomic status; livestock ownership; media exposure; region and place of residence. The measurements of independent variables are described in Table 1.

**Table 1.** Measurements of the Independent Variables

| Variable                | Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Women's Age             | Women's age is measured in whole years. In this study, women's age is coded into five categories: age 15-18, age 19-24, age 25-34, age 35-44, and age 45-49.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Women's Education Level | Education is commonly documented as the farthest degree of educational attainment, classified into categories encompassing no education, primary, secondary, and higher than secondary. In this study, women's education level is recoded into three categories: no education, primary education, and secondary and higher education.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Women's Occupation      | Women who were engaged in gainful employment within the seven-day period before the survey was conducted. The survey collects data on many occupational categories, including professional/technical, business, factory work or blue-collar service, semi-skilled labor/service, unskilled labor, farming/agriculture work, poultry or cattle raising, home-based manufacturing, domestic service, and others are collected during the survey. In this study, women's occupations are recoded into four categories: no work, non-agriculture (professional/technical, business, factory work or blue-collar service, home-based manufacturing), agriculture (farming/agricultural work, poultry or cattle raising), and others (domestic, skilled, or unskilled)                                                                                                                                                                                                                                     |
| Husband's Education     | Education is generally reported as the highest level of education attended in categories of no education, primary, secondary, and higher than secondary. In this study, the husband's education is recoded into three categories: no education, primary education, and secondary and higher education.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Husband's Occupation    | Different categories of occupations like professional/technical, business, factory work or blue-collar service, semi-skilled labor/service, unskilled labor, farming/agriculture work, poultry or cattle raising, home-based manufacturing, domestic service, and others are collected during the survey. In this study, Husband's occupations are recoded into four categories: no work, non-agriculture (professional/technical, business, factory work or blue-collar service, home-based manufacturing), agricultural (farming/agriculture work, poultry or cattle raising), and others (domestic, skilled, or unskilled)                                                                                                                                                                                                                                                                                                                                                                        |
| Socioeconomic Status    | The wealth index serves as a proxy for measuring socioeconomic level. The wealth index is a comprehensive metric that quantifies the overall living level of a household. The calculation of the wealth index involves the use of readily accessible data pertaining to a household's possession of specific goods, such televisions and bicycles, materials employed in building construction, and the nature of water access and sanitary facilities. The wealth index is derived using a statistical technique called principal components analysis, which assigns households to a continuous scale of relative wealth. The Demographic and Health Surveys (DHS) categorize all families that have been questioned into five distinct wealth quintiles in order to assess the impact of wealth on a range of population, health, and nutrition metrics. In this study, socioeconomic status is recoded into three categories: poor (poorest and poor), middle class, and rich (richest and rich). |
| Livestock Ownership     | Livestock ownership was defined as any livestock presence in the household, it was a <i>yes</i> or <i>no</i> question. For example, sheep ownership indicates the absence or presence of sheep in the household. For any type of livestock, the presence of one or more animals indicates ownership.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Media Exposure          | The DHS was conducted to inquire about the frequency with which women engaged in activities such as reading newspapers, listening to the radio, and watching television. Individuals who engage in media exposure at least once per week are classified as being consistently exposed to that particular medium.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Region                  | Region is defined for every cluster or enumeration area (EA) as part of the sample design for the survey. In Bangladesh, eight administrative divisions are considered in the region of residence. In this study, region is used in the same codes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Place of Residence      | Type of place of residence is the designation of the cluster or EA as an urban area or a rural area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Statistical Analysis

### Bivariate Analysis

A contingency table is developed to explore whether the dependent and independent variables are correlated in any way. The impact of women’s adoption of mobile banking is examined using the Pearson chi-square test of independence. The enter method of the logistic regression model is applied to examine the characteristics strongly related to it.

### Logistic Regression Model

To explore determinants of women’s mobile banking adoption, a binary variable representing whether women currently adopted mobile banking services or not was computed.

Here:

Women’s mobile banking adoption

$$= \begin{cases} 0, & \text{if women is not currently adopted mobile banking services} \\ 1, & \text{if women is currently adopted mobile banking services} \end{cases}$$

The binary logistic regression model is given by:

$$\text{logit} (P_i) = \log \left( \frac{P_i}{1-P_i} \right) = \sum_i \beta_i X_i \quad (1)$$

Where:

- $P_i = P \left( Y_i = \frac{1}{X_i} \right) = \frac{\exp (\sum \beta_i X_i)}{1+\exp (\sum \beta_i X_i)}$  = Probability that the  $i^{\text{th}}$  woman is currently adopting mobile banking services.
- $Y_i =$  Women’s mobile banking adoption of  $i^{\text{th}}$  woman;
- $Y_i = 1$  if a woman has currently adopted mobile banking services, and zero (0) if a woman has not currently adopted mobile banking services,
- $X_i = i^{\text{th}}$  predictor variable; and  $\beta_i = i^{\text{th}}$  parameter associated with  $X_i$ .

The enter method of a binary logistic regression model is employed for investigating the factors that influenced women’s mobile banking adoption.

## Results

### Results of Bivariate Analysis

All the analysis is done by SPSS (v23.0) –at first, cross tabulation and Pearson Chi-square ( $\chi^2$ ) test are used to examine whether the covariates are significantly related to women’s mobile banking adoption. Then, those variables significantly associated with the  $\chi^2$  test are used to build a regression model. Table 2 displays the results of the distribution of the study samples of women’s mobile banking adoption with the corresponding  $\chi^2$ -values and  $p$ -values. The distribution shows that all variables are significantly associated with women’s mobile banking adoption except their place of residence.

The distribution depicts that the age of women is strongly significant ( $p < .001$ ) with women’s mobile banking adoption. Only 8.4%, 12.1%, 16.9%, 16.4%, and 11.2% of women aged 15-18, 19-24, 25-

34, 35-44, and 45-49 have adopted mobile banking, respectively. The distribution portrays that women’s mobile banking adoption has been increasing with increasing women’s education level. Mobile banking services are used by 9.5% of illiterate women, 12.9% of primary-educated women, and 16.4% of secondary or highest-educated women. The result reveals that about 13.3% of unemployed women have adopted mobile banking services, whereas 20.3%, 14.6%, and 18.2% are non-agriculture, agriculture, and other (domestic, skilled, or unskilled manual) related works employed women have adopted mobile banking services respectively. The distribution also mentioned that about 12.8%, 12.8%, and 16.5% of women have adopted mobile banking whose husbands are illiterate, primary educated, and secondary or higher educated, respectively. Further, about 15.2%, 14.9%, 12.5%, and 15.5% of women have adopted mobile banking services whose husbands are unemployed, involved in non-agriculture, agriculture, and other (domestic, skilled, or unskilled manual) related work, respectively.

The study illustrates that about 12.7% of women from poor households have adopted mobile banking services, whereas 16.2% of women from the middle class and 5.3% of women from the rich class have adopted mobile banking services. The distribution reveals that women’s mobile banking adoption is significantly ( $p < .05$ ) different by livestock ownership (no = 14.0% vs. yes = 15.3%). The result also depicts that women’s mobile banking adoption is significantly ( $p < .001$ ) different by media exposure (no = 12.9% vs. yes = 15.9%). The study displays that about 21.9% of women are from Barisal, 10.3% from Chittagong, 14.5% from Dhaka, 19.1% from Khulna, 12.8% from Mymensingh, 17.2% from Rajshahi, 16.1% from Rangpur and 7.8% from Sylhet have adopted mobile banking services. Again, the distribution reveals that women’s mobile banking adoption is not significantly ( $p > .05$ ) different by place of residence (urban = 15.1% vs. rural = 14.6%).

**Table 2.** The Distribution of Women’s Mobile Banking Adoption in Bangladesh

| Variable                    | Women’s Mobile Banking Adoption (%) |      |                           |          | Variable                     | Women’s Mobile Banking Adoption (%) |      |          |          |         |      |
|-----------------------------|-------------------------------------|------|---------------------------|----------|------------------------------|-------------------------------------|------|----------|----------|---------|------|
|                             | No                                  | Yes  | $\chi^2$                  | <i>p</i> |                              | No                                  | Yes  | $\chi^2$ | <i>p</i> |         |      |
| <i>Age of Women</i>         |                                     |      |                           |          | <i>Socio-Economic Status</i> |                                     |      |          |          |         |      |
| Age 15-18                   | 91.6                                | 8.4  | 68.624                    | .000     | Poor                         | 87.3                                | 12.7 | 16.38    | .000     |         |      |
| Age 19-24                   | 87.9                                | 12.1 |                           |          | Middle class                 | 83.8                                | 16.2 |          |          |         |      |
| Age 25-34                   | 83.1                                | 16.9 |                           |          | Rich                         | 84.7                                | 15.3 |          |          |         |      |
| Age 35-44                   | 83.6                                | 16.4 |                           |          | Total                        | 85.2                                | 14.8 |          |          |         |      |
| Age 45-49                   | 88.8                                | 11.2 |                           |          | <i>Livestock Ownership</i>   |                                     |      |          |          |         |      |
| Total                       | 85.2                                | 14.8 | No                        | 86       | 14                           | 4.493                               | .034 |          |          |         |      |
| <i>Women’s Education</i>    |                                     |      |                           |          | <i>Media Exposure</i>        |                                     |      |          |          |         |      |
| No education                | 90.5                                | 9.5  | 50.991                    | .000     | Yes                          | 84.7                                | 15.3 | 20.905   | .000     |         |      |
| Primary                     | 87.1                                | 12.9 |                           |          | Total                        | 85.2                                | 14.8 |          |          |         |      |
| Secondary and higher        | 83.6                                | 16.4 |                           |          | <i>Region</i>                |                                     |      |          |          |         |      |
| Total                       | 85.2                                | 14.8 |                           |          | Barisal                      | 78.1                                | 21.9 | 173.141  | .000     |         |      |
| <i>Women’s Occupation</i>   |                                     |      |                           |          | <i>Place of Residence</i>    |                                     |      |          |          |         |      |
| No work                     | 86.7                                | 13.3 | 50.995                    | .000     | Urban                        | 84.9                                | 15.1 | 0.665    | .415     |         |      |
| Non-agriculture             | 79.7                                | 20.3 |                           |          | Rural                        | 85.4                                | 14.6 |          |          |         |      |
| Agriculture                 | 85.4                                | 14.6 |                           |          | Total                        | 85.2                                | 14.8 |          |          |         |      |
| Others*                     | 81.8                                | 18.2 |                           |          | <i>Husband’s Education</i>   |                                     |      |          |          |         |      |
| Total                       | 85.2                                | 14.8 |                           |          | No education                 | 87.2                                | 12.8 | 32.191   | .000     |         |      |
| <i>Husband’s Occupation</i> |                                     |      |                           |          | <i>Region</i>                |                                     |      |          |          |         |      |
| No work                     | 84.8                                | 15.2 | 9.675                     | .022     | Barisal                      | 78.1                                | 21.9 |          |          | 173.141 | .000 |
| Non-agriculture             | 85.1                                | 14.9 | <i>Place of Residence</i> |          |                              |                                     |      |          |          |         |      |
| Agriculture                 | 87.5                                | 12.5 | Urban                     | 84.9     | 15.1                         | 0.665                               | .415 |          |          |         |      |
| Others*                     | 84.5                                | 15.5 | Rural                     | 85.4     | 14.6                         |                                     |      |          |          |         |      |
| Total                       | 85.2                                | 14.8 | Total                     | 85.2     | 14.8                         |                                     |      |          |          |         |      |

Note. \*Domestic, skilled, or unskilled.

### **Result of Binary Logistic Regression Analysis**

The final logistic regression model that is fitted to the data is given by:

$$\text{logit} (P) = \log \left( \frac{P}{1-P} \right) = \sum_i \beta_i X_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_9 X_9 \quad (2)$$

Where:

- $X_1$  = age of women
- $X_2$  = women’s education
- $X_3$  = women’s occupation
- $X_4$  = husband’s education
- $X_5$  = husband’s occupation
- $X_6$  = socioeconomic status
- $X_7$  = livestock ownership
- $X_8$  = media exposure
- $X_9$  = region

For the analysis, the enter method of a logistic regression model is used. The logistic model is constructed using the DHS (2020) to examine the characteristics that influence women’s mobile banking in Bangladesh. The results of the fitted logistic model are presented in Table 3. The result of the logistic model displays that all variables, except socioeconomic status, have a significant ( $p < .05$ ) influence on women’s mobile banking adoption.

The regression model reveals that the age of women is strongly and positively significant ( $p < .001$ ) with women’s mobile banking adoption. It is found that women aged 19-24, age 25-34, age 35-44 and age 45-49 are 1.595, 2.426, 2.528, and 1.741 times more prone to adopt mobile banking than women aged 15-18, respectively. The multivariate model depicts that women’s adoption of mobile banking increases as their education level increases. Women who are primarily educated and secondary and higher educated are 1.345 and 1.698 times more prone to adopt mobile banking than women who have no education, respectively. The model also portrays that women involved in non-agriculture-related and other (domestic, skilled, or unskilled manual) related works are 1.516 and 1.348 times more prone to adopt mobile banking than unemployed women, respectively. However, women involved in agriculture-related work are insignificant.

The regression model illustrates that women with secondary and higher-educated husbands are 1.197 times more prone to adopt mobile banking services than those with uneducated husbands. On the other hand, women with primary educated husbands are insignificant. The result also mentions that women whose husbands are involved in agriculture-related work are 0.764 times less prone to adopt mobile banking services than women with unemployed husbands. But women whose husbands are involved in non-agriculture and others (domestic, skilled, or unskilled manual) are insignificant.

The multivariate model shows that socio-economic status is not significantly ( $p > 0.05$ ) associated with women’s mobile banking adoption. The logistic model indicates that women with livestock ownership are 1.194 times more prone to adopt mobile banking than those without livestock ownership. The regression model depicts that women with media exposure are 1.170 times more prone to adopt mobile banking than women without media exposure. The regression model shows that women from Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet are .402, .602, .793, .532, and .701, .680, and .332 times less prone to adopt mobile banking than women from Barisal respectively.

**Table 3.** The Multivariate Result of Determinants of Women's Mobile Banking Adoption

| Variable                                 | $\beta$ | SE   | p    | Odds Ratio | 95% C.I. for EXP( $\beta$ ) |       |
|------------------------------------------|---------|------|------|------------|-----------------------------|-------|
|                                          |         |      |      |            | Lower                       | Upper |
| <i>Age of Women</i>                      |         |      |      |            |                             |       |
| Age 15-18*                               |         |      | .000 | 1.000      |                             |       |
| Age 19-24                                | 0.467   | .161 | .004 | 1.595      | 1.163                       | 2.186 |
| Age 25-34                                | 0.886   | .155 | .000 | 2.426      | 1.789                       | 3.290 |
| Age 35-44                                | 0.927   | .160 | .000 | 2.528      | 1.846                       | 3.461 |
| Age 45-49                                | 0.554   | .183 | .002 | 1.741      | 1.217                       | 2.490 |
| <i>Women's Education Level</i>           |         |      |      |            |                             |       |
| No education*                            |         |      | .000 | 1.000      |                             |       |
| Primary                                  | 0.296   | .118 | .012 | 1.345      | 1.068                       | 1.693 |
| Secondary and higher                     | 0.529   | .120 | .000 | 1.698      | 1.342                       | 2.147 |
| <i>Women's Occupation</i>                |         |      |      |            |                             |       |
| No work*                                 |         |      | .000 | 1.000      |                             |       |
| Non-agriculture                          | 0.416   | .086 | .000 | 1.516      | 1.281                       | 1.794 |
| Agriculture                              | 0.019   | .073 | .791 | 1.020      | 0.883                       | 1.177 |
| Others (domestic, skilled, or unskilled) | 0.299   | .083 | .000 | 1.348      | 1.145                       | 1.588 |
| <i>Husband's Education</i>               |         |      |      |            |                             |       |
| No education*                            |         |      | .023 | 1.000      |                             |       |
| Primary                                  | 0.003   | .093 | .977 | 1.003      | 0.836                       | 1.202 |
| Secondary and higher                     | 0.180   | .092 | .049 | 1.197      | 1.001                       | 1.433 |
| <i>Husband's Occupation</i>              |         |      |      |            |                             |       |
| No work*                                 |         |      | .018 | 1.000      |                             |       |
| Non-agriculture                          | -0.208  | .116 | .072 | 0.812      | 0.647                       | 1.019 |
| Agriculture                              | -0.269  | .129 | .037 | 0.764      | 0.594                       | 0.983 |
| Others (domestic, skilled, or unskilled) | -0.070  | .116 | .544 | 0.932      | 0.743                       | 1.170 |
| <i>Socio-Economic Status</i>             |         |      |      |            |                             |       |
| Poor*                                    |         |      | .187 | 1.000      |                             |       |
| Middle class                             | 0.133   | .084 | .112 | 1.143      | 0.969                       | 1.347 |
| Rich                                     | 0.023   | .085 | .787 | 1.023      | 0.866                       | 1.210 |
| <i>Livestock Ownership</i>               |         |      |      |            |                             |       |
| No*                                      |         |      |      | 1.000      |                             |       |
| Yes                                      | 0.177   | .063 | .005 | 1.194      | 1.055                       | 1.351 |
| <i>Media Exposure</i>                    |         |      |      |            |                             |       |
| No*                                      |         |      |      | 1.000      |                             |       |
| Yes                                      | 0.157   | .067 | .019 | 1.170      | 1.026                       | 1.333 |
| <i>Region</i>                            |         |      |      |            |                             |       |
| Barisal*                                 |         |      | .000 | 1.000      |                             |       |
| Chittagong                               | -0.912  | .100 | .000 | 0.402      | 0.330                       | 0.488 |
| Dhaka                                    | -0.507  | .095 | .000 | 0.602      | 0.500                       | 0.726 |
| Khulna                                   | -0.232  | .095 | .014 | 0.793      | 0.659                       | 0.955 |
| Mymensingh                               | -0.631  | .110 | .000 | 0.532      | 0.429                       | 0.660 |
| Rajshahi                                 | -0.356  | .099 | .000 | 0.701      | 0.577                       | 0.851 |
| Rangpur                                  | -0.385  | .103 | .000 | 0.680      | 0.556                       | 0.833 |
| Sylhet                                   | -1.133  | .125 | .000 | 0.322      | 0.252                       | 0.411 |

Note. \*Reference category

## Discussion

The study illustrates that women's mobile banking adoption increases with their age. Several authors (Abayomi et al., 2019; Abdinoor & Mbamba, 2017; Fall et al., 2020; Kikulwe et al., 2014; Mbiti & Weill, 2016; Olaleye et al., 2022; Yitbarek & Zeleke, 2013) found the similar result. The findings of this study could explain why women adopted mobile banking services to easily receive money whose husbands and children work abroad and within a country. Moreover, to receive salaries, other benefits like widow allowance, old age allowance, and online bill payment (like utility bills, mobile phone recharge, online shopping, etc.) mobile banking services are used. The model mentions that women's mobile banking adoption is gradually increasing with increasing the level of education. This result is similar to the findings of several studies (Anane & Nie, 2022; Bhuvu, 2023; Fall et al., 2020; Kikulwe et al., 2014; Margaret & Ngoma, 2013; Mbiti & Weill, 2016; Murendo et al., 2015). The potential explanation could be that higher educated women are more likely to see mobile banking services favorably. Educated women may comprehend the advantages of mobile banking, such as its

convenience, accessibility, privacy, and security, better (Bhuva, 2023) and can secure the security of their accounts. The study found that employed women adopted mobile banking services more as compared to unemployed women. This result is consistent in line with Abayomi et al. (2019) and Marumbwa (2014). A possible explanation could be that mobile banking services have been found to change the financial behavior of women (Suri & Jack, 2016). Mobile banking services facilitate employed women to make easy financial transitions for the operating business, optimizing productive activities, receiving salaries, and other financial issues.

The regression model displays that the husband's education is significantly influenced by women's mobile banking adoption. The potential explanation could be that a highly educated husband might be accustomed to technology and feel more at ease utilizing mobile banking services. They can help their partners realize the risk related to the usage of mobile banking and provide useful and objective answers to the items in the questionnaire to confirm the security of the account. The regression model portrays that women with husbands engaged in agriculture-related work are less adopted mobile banking services than women with unemployed husbands. This result could be explained that most farmers utilize mobile banking services to collect agricultural payments and purchase required inputs, where money transactions are massively male-oriented. Despite their substantial contributions to agriculture, women may experience limits as a result of societal standards or technology access hurdles.

The regression model depicts that socio-economic status is insignificant in women's mobile banking adoption. This result is consistent in line with several authors (Annin et al., 2013; Teka & Sharma, 2017; Zeya, 2022). This result implies that socioeconomic status is not effective in influencing women's mobile banking adoption in Bangladesh. Women with livestock ownership are more likely to adopt mobile banking than those with no livestock ownership. This result could explain that livestock ownership could engage women in income-generating activities. Women are likely to rely on this technology to maximize their productive activities because they bear a great deal of responsibility for their families and enterprises. The study shows that women with media exposure are more prone to adopt mobile banking than women without media exposure. The explanation could be that the progress of media platforms motivated by the advancement of technology have bridged the gaps in illiteracy. This could be able to mitigate the impact that educational background has on the uptake of mobile services. The usage of social media has achieved more ground for learning and educating people irrespective of gender than education through traditional classroom settings (Lai & Li, 2015).

The logistic regression model portrays that women's mobile banking adoption significantly differs by geographical location. Choudhury and Bhattacharjee (2015), and Rasheduzzaman et al. (2021) found a similar result. This result could be explained that women's mobile banking adoption is varied in the different geographical locations due to education, social norms, financial literacy levels, technological appropriation and employment opportunities, and access to financial infrastructure.

## **Conclusion**

Mobile banking is the latest among Internet banking systems. It is a technological system that enables users to do various financial transactions through mobile phone devices (Koksal, 2016). This study investigates the demographic and socioeconomic characteristics that affect women's mobile banking adoption in Bangladesh using DHS (2020) data. The enter method of a binary logistic regression model is applied to identify the factors that influenced women's mobile banking adoption. The Chi-

square test of independence depicts that all variables (women's age, education, and occupation; husband's education and occupation; socioeconomic status; livestock ownership; media exposure and region), except their place of residence, are significantly ( $p < .05$ ) associated with women's mobile banking adoption. Further, the regression model shows that all variables (women's age, education, and occupation; husband's education and occupation; livestock ownership; media exposure; and region), except socioeconomic status, which are significant in the Pearson chi-square test of independence, are significantly ( $p < .05$ ) associated with women's mobile banking adoption. The study mentions that the Chi-square test of independence depicts a highly significant association between socioeconomic status and women's mobile banking adoption, but the logistic regression model shows an insignificant relationship between them.

### ***Policy Implications***

Following the outcomes of this study, the study recommends that respective banks should point to the need to focus growth strategies on the younger generation as they seem to be early adopters of technology. The respective Banks should design their products and services to be more customer-friendly for people of different ages, education, professions, and geographical locations, especially women. The Respective bank can design the push-pull services in the local Bengali language so that different levels of people, especially women, can understand. The respective banks should enhance their accessibility, and more marketing should be made in every feasible media to inform people, particularly women, about mobile banking services.

### ***Limitations and Future Research***

The study is focused on 15-49 aged ever-married women with a few numbers of demographic and socio-economic characteristics in Bangladesh. This study is unable to explain all the characteristics affecting the adoption of mobile banking among women of all ages in Bangladesh. As a result, a future study can be done to consider women of all ages and address more demographic and socioeconomic characteristics like age, sex and education of household's head, marital status of women, type of family structure, network coverage, access to energy, distance to the marketplace, type of transport communication, etc., that influence women's adoption of mobile banking.

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