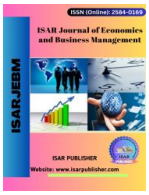
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Social-Demographic, Financial and Digital-Financial Factors Associated with Financial Inclusion in Bangladesh: Evidence from Banking, Microfinance and Mobile Financial Services

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Abstract: The objective of this study is to examine the extent of financial inclusion among mobile financial services (MFS) users and explore other aspects covering demographic, socioeconomic and digital-financial variables associated with different levels of financial inclusion in Bangladesh. Cross-sectional data on 503 MFS users across 19 districts (collected during March-July 2026) were used to construct a multidimensional Financial Inclusion Index (FII). The dimensions are access, usage, quality and affordability, financial capability, and security. Besides an index based on 8 different indicators, Financial Access Score (FA Score) was constructed. The analysis was based mainly on descriptive statistics, bivariate correlations and multiple regression analysis. The sample mean FII was 0.551 (SD = 0.185). Respectively, 72.2% and 4.4% of respondents had Moderate/High and Very High financial inclusion. Despite Digital Financial Services (DFS) seemed widely available, only 14% respondents received formal financial training. The regression model can explain 59.1% of the variations of FII. Age, gender, income, residence, DFS awareness, financial training, and FA Score were associated with FII, whereas, education, smartphone ownership, and internet access were not while controlling for other variables. The study expanded financial inclusion research in Bangladesh by analyzing MFS users through a multidimensional index which considers more than mere access and jointly considers socioeconomic as well as digital-financial factors. It suggests that access should be supplemented by greater focus on financial as well as digital literacy, affordability, security and service quality, and its dignified use at the same time and space.

Keywords: *Financial Inclusion; Mobile Financial Services; Digital Financial Services; Financial Access; Financial Awareness; Bangladesh.*

JEL Classification: G21; D14; O33.

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1. INTRODUCTION

Financial inclusion is increasingly recognized as an essential requirement to allow individuals greater participation in the formal financial system and improve their financial security. Financial inclusion is multidimensional and goes beyond the provision of access to financial services to embrace their usage, affordability, appropriateness, and security (Klapper *et al.*, 2025). Digital financial services and mobile financial services, in particular, provide great opportunities to the unbanked and under-banked population through the reduction of geographical and other barriers to access to finance (Demirguc-Kunt *et al.*, 2018; Anane & Nie, 2022). However, the use of basic mobile financial services does not equate to being financially included; access and transactions are only two of the aspects that show financial inclusion, which involves multiple dimensions of access, usage, affordability, and security (Demirguc-Kunt *et al.*, 2018; Klapper *et al*., 2025).

Bangladesh presents an interesting context because of the rapid expansion of MFS and digital transactions in Bangladesh. Bangladesh Bank (2023) highlights that MFS has improved access to payment services in places where traditional banking services are less available. MFS can be used for transfers, payments, and salaries, utility bills, and remittances (Bangladesh Bank, 2025, 2026). Still, greater digital access does not automatically mean greater financial inclusion. In 2022, mobile money account ownership was at 41.9%, but bank deposit account ownership was 26.2% at the same time, with 73.8% mobile phone access and 45.5% internet access (Bangladesh Bureau of Statistics [BBS], 2023). Only around 17.4% of those with mobile money accounts normally had money remaining in them, and 4.2% used mobile money for reasons of savings in the last 12 months (Klapper *et al.*, 2025). The patterns described above imply that digital connectivity and access to MFS should not be a surrogate measure for financial inclusion.

When considering financial inclusion, it can vary due to socio-economic and digital characteristics, including age, gender, education, income, and residential location, influencing access to and use of formal financial services, while financial awareness, digital skills, and access to suitable mobile products influence participation within the digital finance system (Klapper *et al.*, 2025). In Bangladesh, DFS use may be restricted by transaction costs, connectivity constraints, proximity to agents, and concern over trust/fraud (Hunter *et al.*, 2026). Consideration of these factors will offer a far more holistic and broad-minded examination into financial inclusion than simply viewing it as account ownership or MFS use, as it is a multidimensional concern.

Past studies have looked at MFS and financial inclusion in the context of Bangladesh from various aspects. Akhter and Kahlily (2020) looked into MFS and financial inclusion, while Aziz and Naima (2021) explored the digital financial inclusion of the rural area. Further, Hazra and Priyo (2021) looked into MFS as a payment mechanism, while Howlader and Halder (2025) tried to relate fintech and MFS towards financial inclusion using a composite index. However, little is known about the state of broader financial inclusion of MFS users at the individual level using a multi-dimensional index that collectively considers the socio-economic and the digital-financial characteristics among the citizens. Evidence about the bivariate association when accounting for all other characteristics in a multivariable framework seems to be limited in literature.

Against this background, this paper evaluates Financial Inclusion of MFS users in Bangladesh through a composite Financial Inclusion Index (FII) that encompasses various dimensions of inclusion and studies its associations with a range of sociodemographic and digital-financial attributes under a multivariable framework. By addressing financial inclusion at an individual level, the paper gives an indication of the country's overall financial inclusion in its digital financial environment, while highlighting the implications, in terms of what should be done, to further financial inclusion beyond access alone.

2. LITERATURE REVIEW

2.1 Financial Inclusion and Digital Financial Services

Financial inclusion is about the availability, accessibility, affordability, and appropriate use of appropriate financial services such as payments, savings, credit, insurance and remittances (World Bank, 2014). Beyond accounts or physical access, inclusion means effective use of affordable, safe and appropriate products and services (World Bank, 2014, 2022). Financial inclusion has a multidimensional approach that includes access, quality, and usage aspects like convenience, transparency, safety, consumer protection, and financial literacy (Pearce & Ruiz Ortega, 2012).

With the development of DFS, MFS, the transaction and geographical barriers have been reduced. MFS is being used to pay bills, make purchases, receive wage and remittance, as well as to perform cash withdrawal and deposit, inter-personal transfers and government payments (Demirguc-Kunt *et al.*, 2015; World Bank, 2022). MFS was introduced to Bangladesh in 2011 through a bank-led regulatory model and has emerged as a significant element of the financial and payment infrastructure (Bangladesh Bank, 2012, 2026). MFS adoption is related to socio-economic characteristics, such as income, education, residence, employment and migration status (Akhter & Khalily, 2020), while accessibility, mobility and convenience are decisive factors among mobile banking use (Hazra & Priyo, 2021). Mobile banking could also affect household financial behavior of saving and consumption, especially among the vast

population from rural areas and internal migrants (Lee *et al.*, 2021).

Access to DFS or MFS does not equate with financial inclusion, as users may rely upon MFS just for transactional purposes without indulging in other products like savings, credit, and insurance, etc. Connectivity, digital skills, financial literacy, awareness, transaction costs, and trust can limit access or effective participation to digital finance (Aziz & Naima, 2021). The study measures financial inclusion using a multidimensional Financial Inclusion Index (FII) covering access and usage, quality and affordability, and financial capability and security aspects.

2.2 Factors Associated with Financial Inclusion

Socio-economic and demographic characteristics are frequently linked to financial inclusion. Income, education, gender, and age are found to be important factors determining participation in formal finance in 37 African countries (Zins & Weill, 2016). Gender disparities in financial inclusion can be reduced by education, with differing effects across the lines (Sharif *et al.*, 2023). Income affects the ability of maintaining an account, saving formally, fulfilling transaction requirements, and obtaining credit (Zins & Weill, 2016), and thus education plays a significant role in reducing gender disparities in financial inclusion, although its impact varies across different groups (Sharif *et al.*, 2023). Residence location is also important, as people in rural areas may face geographical or infrastructure barriers, problems with connectivity, and lack of information (Aziz & Naima, 2021).

As financial services become technology dependent, digital capabilities are taking on increasing importance. These include having internet/smartphone access, digital skills, and awareness of DFS can affect the ability to use digital financial products. However, technology access alone does not guarantee financial inclusion. Some studies showed the effect of digital literacy varies depending on the context, while research suggests digital and financial literacy, social awareness, and good digital infrastructure are of the top priority in addressing inequalities in technological access in Bangladesh (Adel, 2024; Aziz & Naima, 2021). Some other studies indicate the importance of digital skills in the active use of financial products using banking platforms (Vik *et al.*, 2024). Recent evidence from Bangladesh also shows that socio-economic and demographic characteristics still play roles in shaping digital financial inclusion in Bangladesh (Chowdhury & Miraz, 2026).

Awareness and training may influence participation by enhancing the knowledge and confidence to use financial services. Access is another foundation, as people must be able to obtain financial services first before being able to use them. Access issues could relate to physical distance, transaction cost, documentation, reliability of the service, and availability of suitable products. Though global ownership of accounts has increased, disparities by income, gender, location, and education still persist (Demirguc-Kunt *et al.*, 2022). Financial inclusion involves access to multiple financial and digital sources of finance, and in the study, the combined access (access to multiple formal and digital financial channels) is captured using the Financial Access Score (FA Score).

Thus financial inclusion includes both socio-economic characteristics and digital-financial ones, and in which the two could also be interrelated (e.g., socio-economic resources could affect technology access and digital capability). Hence, analyzing them simultaneously would indicate which are associated with more multidimensional financial inclusion whilst controlling for other relevant factors.

2.3 Research Gap and Conceptual Framework

Research that has been undertaken on MFS and DFS in Bangladesh has investigated MFS adoption, digitized financial inclusion, rural financial inclusion, and financial behavior (Akhter & Khalily, 2020; Aziz & Naima, 2021; Hazra & Priyo, 2021). However, limited studies have examined wider individual level financial inclusion among MFS users through a multidimensional index including access, usage, quality & affordability, and financial capability and security.

Another gap is the joint examination of socio-economic and digital-financial characteristics. While both groups of factors have been linked with financial inclusion, fewer studies look at them in a joint framework and examine whether socio-economic characteristics remain associated with financial inclusion when digital-financial characteristics are brought into account. Relying on bivariate association, we cannot say whether the relationship exists after factoring in other characteristics. A multivariable approach helps to get a truer assessment of the factors associated with financial inclusion on the individual level.

The study evaluates financial inclusion among MFS users in Bangladesh from a composite FII using socio-economic and demographic factors (age, gender, education, income, and residence), digital-financial factors (DFS awareness, financial training, internet access, and smartphone ownership), and broader access to finance (FA Score). The characteristics are then linked with multidimensional financial inclusion, thus guiding descriptive, bivariate, and multivariable analyses based on a conceptual framework.

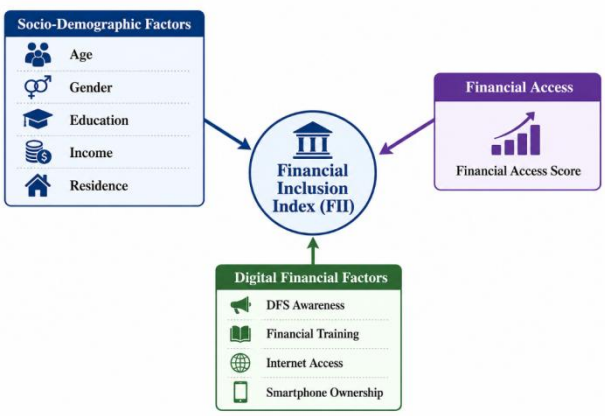


Figure 1. Conceptual framework of the study

Source: Author's own work.

3. METHODOLOGY

3.1 Study Design, Population, and Sampling

The study investigates financial inclusion and factors associated with its variation among MFS users of Bangladesh, using a quantitative cross-sectional explanatory design. Primary data was collected via a structured questionnaire to measure financial inclusion using a multidimensional Financial Inclusion Index (FII). Descriptive statistics, bivariate association analysis, and multiple linear regression were used for the study. Since our study is cross-sectional, interpretations in our study are made concerning associations, not causal impacts.

The respondents for this study were MFS users (bKash, Nagad and Rocket) of Bangladesh. As there is no single sampling frame, a nonprobability convenience sampling method was used. Both online and offline surveys were conducted from March-July 2026 in 19 districts of the country. A total of 650 individuals had been contacted; 503 provided complete and valid answers, yielding a response rate of 77.38%. Nobody was excluded for being incomplete or invalid, and as such, 503 people actually participated as the respondents for the survey.

Table I. Sampling procedure and sample distribution

Item	Description
Target Population	Individual MFS users residing in Bangladesh
Sampling Unit	Individual MFS Users
Sampling Technique	Non-probability convenience sampling
Data Collection Method	Structured questionnaire survey
Geographical Coverage	19 districts of Bangladesh
Data Collection Period	March - July, 2026
Questionnaires Distributed	650
Responses Received	503
Incomplete/ Invalid Responses	0
Final Sample Size	503
Response Rate	[503 ÷ 650 × 100]% = 77.38%

Source: Author's own work.

3.2 Data Collection Procedure

Identical structured survey questionnaire was developed and run online as Google Forms survey and offline as a paper-based survey. The offline questionnaire was given in-person, as a hard copy. Later, the data from online and offline were combined, cleaned of duplicates, checked for inconsistencies or any errors, and processed further.

3.3 Measurement of Study Variables

The dependent variable is FII; while socio-economic (age group, gender, education level, monthly income, residence), digital-financial (DFS awareness, financial training, access to internet, smartphone ownership), and financial-access (FA Score) characteristics are the explanatory variables. Age group, education and income are ordered, while binary characteristics are encoded as dummies where necessary.

The FA score measures respondents' access to formal and digital financial services. The definition, measurement, and coding of all variables are given in Table II.

Table II. Definitions and measurements of study variables

Variable	Variable Type	Measurement	Coding
Financial Inclusion Index (FII)	Dependent/ Outcome	Scale/ Index	Composite index ranging from 0 - 1
Age Group	Control/ Independent	Ordinal	1 = Under 20, 2 = 21–30, 3 = 31–40, 4 = 41–50, 5 = Above 50
Gender	Control/ Independent	Nominal	1 = Male, 2 = Female, 3 = Other
Education Level	Control/ Independent	Ordinal	1 = No Formal Education, 2 = Primary, 3 = Secondary, 4 = Higher Secondary, 5 = Bachelor or Higher
Monthly Income	Control/ Independent	Ordinal	1 = Below BDT 10000, 2 = BDT 10001 - 20000, 3 = BDT 20001 - 40000, 4 = BDT 40001 - 60000, 5 = Above BDT 60000
Residence Location	Control/ Independent	Nominal	1 = Urban, 2 = Rural
DFS Awareness	Independent	Nominal	0 = No, 1 = Yes
Financial Training	Independent	Nominal	0 = No, 1 = Yes
Internet Access	Independent	Nominal	0 = No, 1 = Yes
Smartphone Ownership	Independent	Nominal	0 = No, 1 = Yes
Financial Access Score (FA Score)	Independent	Scale/ Index	Composite index ranging from 0 - 8

Source: Author's own work.

3.4 Construction of the Financial Access Score

Eight binary financial-access indicators have been added up to calculate the FA Score. Each indicator was coded 1 when the respondent had or used the respective service and 0 otherwise using the following calculation.

$$\boldsymbol{FAScore_i = \sum_{j=1}^{8} A_{ij}}$$

Bank account ownership, MFI use, MFS account ownership, online banking, bank loan access, MFS loan access, banking application use, and MFS application use were the indicators leading to a score ranging from 0 to 8, with higher values denoting greater access.

3.5 Construction of the Financial Inclusion Index

Beyond basic access, FII sought to include access, usage, quality and affordability, and financial capability and security, for measuring financial inclusion. Under access, it has four indicators related to bank account ownership, participation in MFI/MFS, and loan access. Usage contains eight indicators related to money transfers, bill payment, merchant payment, mobile recharge, savings, salary deposits, remittances, and bank usage. Quality and affordability included five indicators for service charge, transaction fees, documentation requirements, speed/quality, and network availability. Financial capability and security contains six indicators for awareness, financial literacy, digital skills, trust, privacy, and security.

Table III. Dimensions and indicators of financial inclusion index (FII)

FII Dimension	No. of Indicators	Core Indicators
Access	04	Bank account ownership, MFI participation, MFS account ownership, loan access
Usage	08	Money transfer, bill payment, merchant payment, mobile recharge, savings, salary deposit, remittance, bank transactions
Quality and Affordability	05	Service charges, transaction fees, documentation, service speed, network reliability
Financial Capability & Security	06	DFS awareness, financial literacy, digital skills, trust, privacy, security

Source: Author's own work.

Each indicator was normalized to 0-1, with higher values suggesting more financial inclusion. Within each dimension, indicator scores were averaged such that dimensions with more indicators were not weighted more heavily. FII was calculated as the equally weighted average of each of the four dimension scores:

$$FII_i = \frac{1}{4}\left[\left(\frac{\sum_{j=1}^{4} A_{ij}}{4}\right) + \left(\frac{\sum_{j=1}^{8} U_{ij}}{8}\right) + \left(\frac{\sum_{j=1}^{5} Q_{ij}}{5}\right) + \left(\frac{\sum_{j=1}^{6} C_{ij}}{6}\right)\right]$$

Here, FII_i is the index value of respondent *i* and A_{ij}, U_{ij}, Q_{ij} and C_{ij} represents normalized access, usage, quality and affordability and financial capability and security indices respectively. FII scaled between value of 0 and 1- with higher values representing greater FI. The assigned categories are: Very Low (0.00-0.20), Low (0.21-0.40), Moderate (0.41-0.60), High (0.61-0.80) and Very High (0.81-1.00). Equal weighing is used, wherein all dimensions are deemed to possess equal significance.

3.6 Statistical Analysis

The study variables were summarized using descriptive statistics. The frequencies and percentages were used to report the categorical data, while means, range, and standard deviations, where applicable, were used to report the composite measures.

In terms of analyzing the bivariate associations prior to multivariable analysis, the relationship between FII (numeric) and ordered independent variables (age group, education level, income level, FA Score) was analyzed by Spearman's rank-order correlations. Point-biserial correlations between FII and the categorical/dichotomous independent variables such as gender, residence, DFS awareness, financial training, internet use and smartphone use were measured.

Independent association between various explanatory variables with FII was obtained by estimating multiple linear regression model that generated 19 predictor coefficients as independent variables for analysis since age group, education and income were classified into dummies and took the first of their respective categories to be the reference point for the analysis. The predictors included were gender, residence, DFS awareness, internet access, smartphone ownership, and FA Score along with education, age group and income.

The regression model was specified as:

$$FII_i = \beta_0 + \sum_{j=1}^{19} \beta_j X_{ji} + \varepsilon_i$$

Here FII_i = Financial Inclusion Index for respondent *i*, β_0 = intercept, β_j = coefficient for predictor *j*, X_{ji} = explanatory variables, ε_i = error term. Statistical significance was assessed at the 5% level ($p < 0.05$).

3.7 Regression Diagnostics

Several diagnostic procedures were done to examine the regression assumptions as well as the stability of the model. For multicollinearity, GVIF and GVIF^(1/2Df) adjusted for the categorical variables were used. For heteroskedasticity, the Studentized Breusch-Pagan test was utilized. The leverage values and Cook's distance helped to determine whether any observations could be influential.

4. RESULTS

4.1 Respondents' Characteristics and MFS engagements

The demographics of the 503 respondents have been summarized in Table IV. Participants in the focus group were distributed most often between the age of 31 to 40 at 40% (n = 202). Those aged between 21 to 30 years came second at 28% (n = 139). Males predominated (68%, n = 342), with 32% (n = 161) of respondents being females. The majority were found married (76.3%, n = 384); while, 74% (n = 370) having bachelor's or higher degree qualification. In terms of occupation, majority was observed government employee (35%, n = 174), next group comprising private employee (24%, n = 123) and, business/self-employed (18%, n = 92). The monthly income of almost one-third respondents (31%, n = 154) was above BDT 60,000, 23% (n = 118) had income in the range from BDT 40,001 - BDT 60,000. Majority respondents resided in urban area (82%, n = 410).

Table IV. Demographic characteristics of respondents (N=503)

Characteristics	N = 503[1]
Age Group	
Under 20	28 (5.6%)
21 - 30	139 (28%)
31 - 40	202 (40%)
41 - 50	87 (17%)
Above 50	47 (9.3%)
Gender	
Male	342 (68%)
Female	161 (32%)
Marital Status	
Single	118 (23.5%)
Married	384 (76.3%)
Other	01 (0.2%)

Education Level	
No Formal Education	01 (0.2%)
Primary	04 (0.8%)
Secondary	38 (7.6%)
Higher Secondary	90 (18%)
Bachelor or Higher	370 (74%)
Occupation	
Student	53 (11%)
Government Employee	174 (35%)
Private Employee	123 (24%)
Business/ Self-Employed	92 (18%)
Expatriate	10 (2.0%)
Wage Earner	03 (0.6%)
Home Maker	48 (9.5%)
Monthly Income	
Below BDT 10,000	85 (17%)
BDT 10,001 - 20,000	65 (13%)
BDT 20,001 - 40,000	81 (16%)
BDT 40,001 – 60,000	118 (23%)
Above BDT 60,000	154 (31%)
Residence Location	
Rural	93 (18%)
Urban	410 (82%)

[1]n (%)

Source: Author's own work.

Figure 2 describes the time spent using MFS. The biggest number (66.8%) of respondents had spent more than 5 years using MFS, while 14.5% of the respondents had spent 3-5 years and 11.5% had spent 1-3 years using MFS. The 81.3% of the respondents surveyed used MFS since three or more years, while a low proportion had used it from shorter periods. This indicated that MFS use was established at higher rates on average among the respondents.

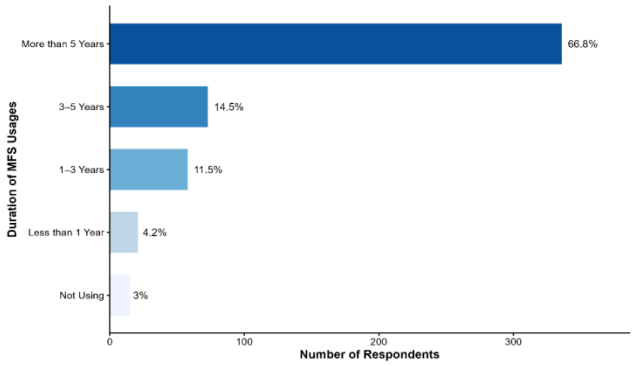


Figure 2. Duration of MFS usages

Source: Author's own work.

Figure 3 shows the frequency of MFS usages. A total of 45.0% used MFS daily and 34.6% of them used MFS weekly, making it clear that every day or weekly MFS consumers was at 79.6%. Monthly MFS usage and rarely usage were accounted for by 14.6% and 5.8%.

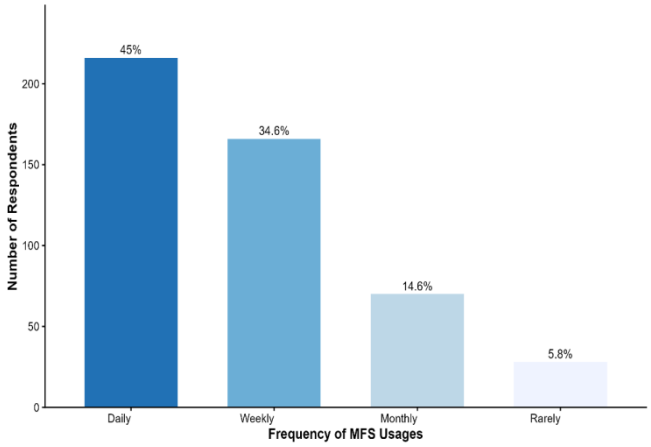


Figure 3. MFS usages frequency

Source: Author's own work.

Figure 4 illustrates the age-wise usages of MFS of the respondents. High usages (96.6%) in age category 41-50 years, followed by (95.5%) in category 31-40 and (95%) in category 21-30 are noted. Non-usages are higher in ages below 20 years with 25%, followed by above 50 with 19.1%.

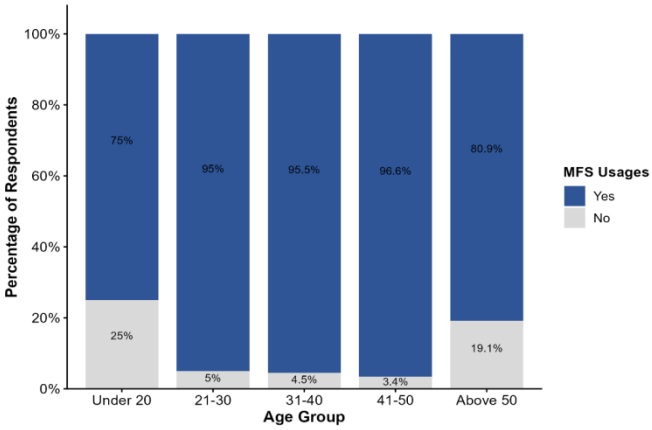


Figure 4. MFS usages by age group

Source: Author's own work.

Figure 5 illustrates the purpose of using banking services. Most people use these services for savings (72.2%). In second spot come transactions (71.0%). Salary deposit is third at 61.8%, followed closely by security of money (58.8%). Access to loans is at 44.5%. It is only 5.4%, however, in foreign trade.

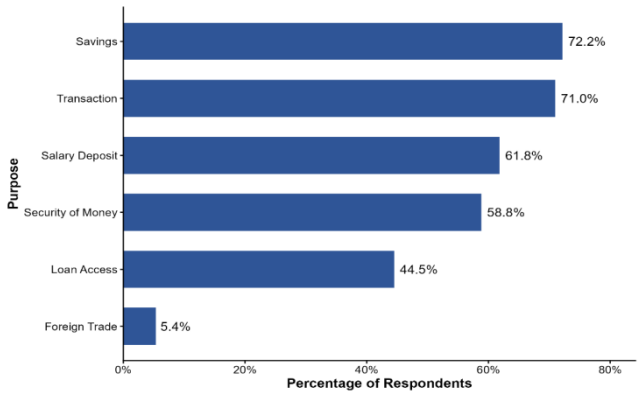


Figure 5. Purpose of using banking services

Source: Author's own work.

Note. Respondents were able to select multiple purposes, hence the percentages do not equate to 100%.

The barriers concerning access to conventional banking are shown in Figure 6. They include slow service (62.4%), service charges (58.4%), and distance from banks (56.9%). Other reasons include concerns on privacy (55.1%), documentation hassles (55.1%). Lack of trust is shown to be a barrier experienced by 53.7% of the respondents.

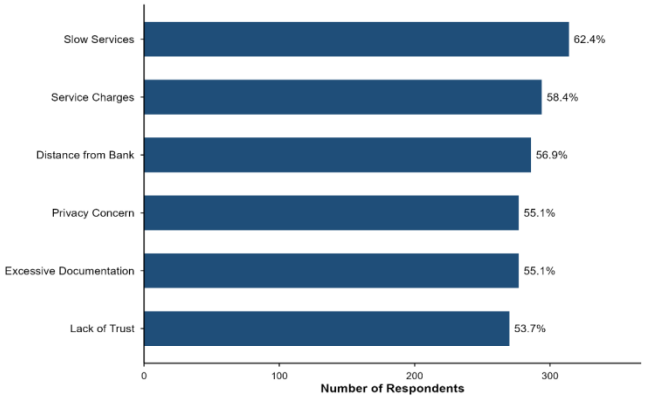


Figure 6. Barriers to use banking services

Source: Author's own work.

Note. The respondents were allowed to choose more than one type of barrier so the totals will not add up to 100%.

Figure 7 shows the main causes for using MFS given by the respondents. Money transfer (86.1%) and mobile recharge (82.7%) were the most popular purposes of the respondents for using MFS. These were then closely followed by paying bills and fees (74.6%) and saving (72.2%). Salary depositing (61.8%) was also a popular purpose of using MFS. Only a small number of the respondents opted for merchant payment (32.0%) and for short term emergency loans (31.2%). Only 8.7% use MFS for remittance purpose.

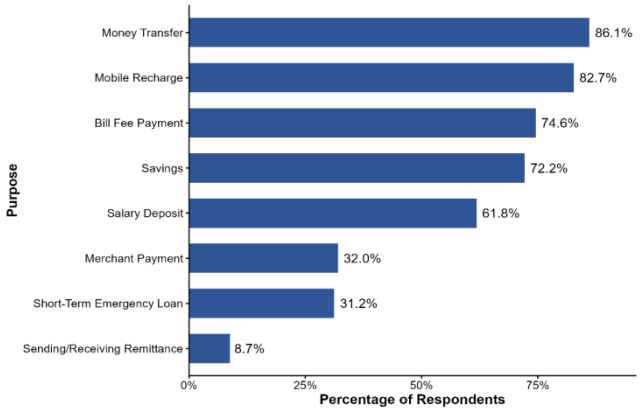


Figure 7. Purpose of using MFS

Source: Author's own work.

Note. The respondents were allowed to choose more than one purpose; therefore, total percentage does not add up to 100%.

Figure 8 shows the main problems which MFS users faced. The biggest problem was transaction fees (74.2%); a close second was security problems, which accounted for 70.8%, with effects of network problems having been felt by 50.3% of the MFS users. However, lack of digital skills (12.5%) was the least often reported by the respondents.

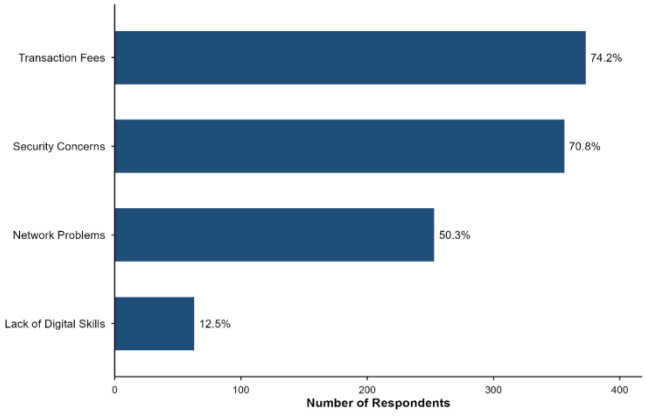


Figure 8. Challenges to use MFS

Source: Author's own work.

Note. The challenges are not mutually exclusive and respondents could have more than one.

4.2 Findings on Descriptive Statistics on Financial and Digital Financial Services

Table V shows the access of respondents to formal and digital financial services. The majority of respondents owned MFS (93%) and bank (88%) accounts, and members of MFIs constitute 24% of the participants. With regards to access to credit, 38% have drawn loans from banks compared to 18% who have done so through MFS. It was discovered that 22% of the respondents were required by institutions to have MFS to receive salaries. Almost all of the respondents (98%) owned a smartphone and 95% had

access to the internet. 84% used online banking, 74% had banking applications, and 90% had MFS applications installed on their smartphone. 81% of the people knew about the DFS that can be availed, yet only 14% had availed financial or DFS training.

Table V. Access to, use of, and awareness of financial and digital financial services

Characteristics	N = 503[1]
Having Bank Account	444 (88%)
Having MFIs Account	122 (24%)
Having MFS Account	468 (93%)
Forced to Use MFS	113 (22%)
Taken Loan from Bank	189 (38%)
Taken Loan from MFS	90 (18%)
Having Smartphone	492 (98%)
Having Regular Internet Access	476 (95%)
Using Online Banking	424 (84%)
Using Banking Apps	373 (74%)
Using MFS Apps	455 (90%)
Aware of DFS	409 (81%)
Taken Financial Training	71 (14%)

[1]n (%)

Source: Author's own work.

Figure 9 shows the distribution of the Financial Access Score (FA Score) that ranges from 0 to 8. 75.4% of the respondents scored a 5, 6, 7, or 8. 32.0% scored a 5, 24.5% a 6 and 14.7% a 7. In contrast, a mere 2.6% scored a 0 and 0.4% scored a 1.

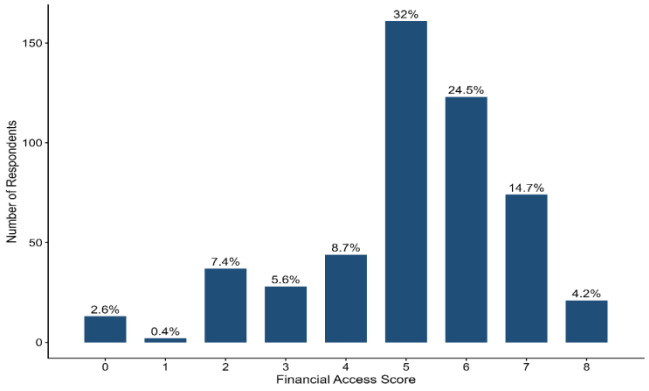


Figure 9. Distribution of financial access score

Source: Author's own work.

4.3 Financial Inclusion Index

The financial inclusion index (FII) between 0 and 1 is plotted in Figure 10. The average FII is 0.551 (SD = 0.185) and the median is 0.575. The respondents had a moderate level of financial inclusion. However, most of the values (58.8%) fall between 0.50 to 0.80, with few people scoring over 0.90 or under 0.20.

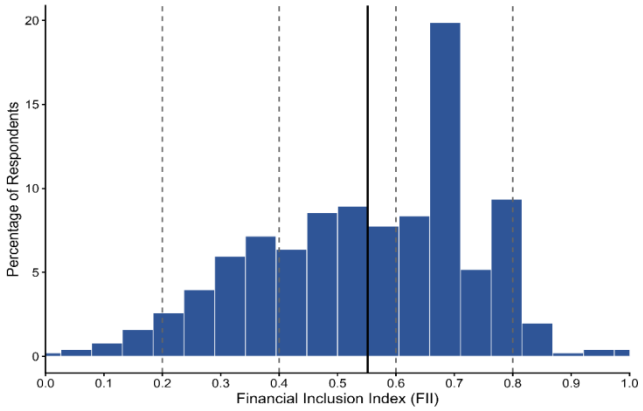


Figure 10. Distribution of financial inclusion index (FII)

Source: Author's own work.

Figure 11 shows the distribution for the categories of the Financial Inclusion Index. The majority of the population interviewed had a High level of financial inclusion (41.4%) followed by a Moderate level of inclusion (30.8%). Taken together, they represent 72.2% implying that most are financially fairly well-included while 19.9% had a Low level of FII and 3.6% had a Very Low and 4.4% had a Very High level, respectively.

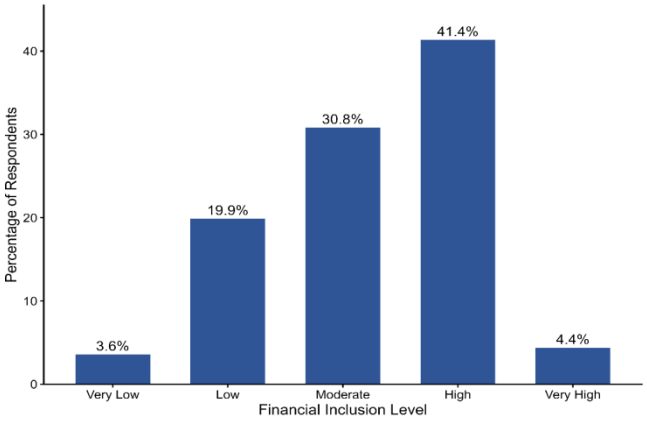


Figure 11. Level of financial inclusion

Source: Author's own work.

4.4 Bivariate Correlation Analysis

In Table VI, results show the bivariate association between FII and various selected groups of demo-economic and digital-financial variables. Most of the variables were associated with FII.

Table VI. Bivariate associations between selected factors and financial inclusion index

Variable	Association with FII	Interpretation
Age Group	0.279***	Moderate positive association
Gender	0.243***	Positive association
Education Level	0.355***	Moderate positive association
Monthly Income	0.566***	Strong positive association
Residence Location	- 0.326***	Moderate negative association
DFS Awareness	0.427***	Moderate positive association
Financial Training	- 0.015	No significant association
Internet Access	0.245***	Positive association
Smartphone Ownership	0.196***	Weak positive association
Financial Access Score	0.516***	Strong positive association

Source: Author's own work.

Note. Spearman's rho for ordinal/continuous and point-biserial correlations for binary variables $p < 0.05$, $p < 0.01$, $p < 0.001$

Income has stronger positive relationship with FII ($r = 0.566$, $p < 0.001$) as compared to FA Score ($r = 0.516$, $p < 0.001$) and DFS awareness ($r = 0.427$, $p < 0.001$). Moreover, income has a positive relationship with Education Level ($r = 0.355$, $p < 0.001$) and age group ($r = 0.279$, $p < 0.001$).

Gender ($r = 0.243$, $p < 0.001$), internet access ($r = 0.245$, $p < 0.001$) and smartphone ownership ($r = 0.196$, $p < 0.001$) were positively associated with FII, while financial training showed no notable correlation ($r = -0.015$, $p = 0.736$). Residence was negatively associated with FII, with $r = -0.326$, $p < 0.001$.

Therefore, income, financial access, and DFS awareness were noted as the variables with the highest bivariate correlation with FII, and these were then considered for multivariable analysis.

4.5 Multiple Linear Regression Analysis

The data on Table VII shows that the multiple linear regression model was deemed to be significant. $F(19,483) = 36.769$, $p < 0.001$ which denotes overall significance of model. Thus the factors included in model jointly explain 59.1% of variation in FII ($R^2 = 0.591$, adjust $R^2 = 0.575$).

After adjustment for the other variables, participants aged 41-50 were more likely to have more FII score than their under 20-year-old counterparts ($\beta = 0.072$, $p = 0.027$). The other age ranges were not statistically different from the reference group. Gender was also associated with FII ($\beta = 0.028$, $p = 0.026$).

FII was not independently associated with education. However, income exhibited a non-linear association with FII, as individuals earnings BDT 10,001 - 20,000 had lower FII score than those earning Below BDT 10,000 ($\beta = -0.046$, $p = 0.043$), BDT 40,001 - 60,000 ($\beta = 0.105$, $p < 0.001$) and Above BDT 60,000 ($\beta = 0.094$, $p < 0.001$).

However, between BDT 20,001 - 40,000 group and the reference group, there was no significant difference.

Residence was strongly associated with FII ($\beta = -0.062$, $p < 0.001$). Since residence was coded 1 for Urban and 2 for Rural so it indicated that (holding other variables constant) predicted FIIs of respondents residing in rural Bangladesh were likely to be lower than FIIs of respondents residing in urban Bangladesh.

DFS awareness was also positively linked to FII ($\beta = 0.079$, $p < 0.001$). Also linked to Financial Access Score was FII ($\beta = 0.051$, $p < 0.001$).

Financial training has a strong negative adjusted association with FII ($\beta = -0.077$, $p < 0.001$), but the bivariate association between financial training and FII is not significant. It means that the association we find between financial training and FII cannot be considered as evidence that financial training reduces peoples' financial inclusion; it is an adjusted association.

FII and internet access ($\beta = -0.005$, $p = 0.861$) and FII and smartphone ownership ($\beta = -0.014$, $p = 0.757$) do not have a significant association in this adjusted model.

Table VII. Multiple regression results for financial inclusion index

Predictor	β	SE	t	p
Age Group				
Group 2: 21 - 30	0.038	0.030	1.256	0.210
Group 3: 31 - 40	0.024	0.032	0.757	0.449
Group 4: 41 - 50	0.072	0.033	2.217	0.027*
Group 5: Above 50	0.047	0.033	1.413	0.158
Gender	0.028	0.013	2.237	0.026*
Education Level				
Level 2: Primary	0.040	0.139	0.285	0.776
Level 3: Secondary	0.064	0.126	0.507	0.612
Level 4: Higher Secondary	0.048	0.124	0.390	0.697
Level 5: Bachelor or Higher	0.036	0.124	0.289	0.773
Income Category				
Category 2: BDT 10001 - 20000	- 0.046	0.023	- 2.033	0.043*
Category 3: BDT 20001 - 40000	- 0.002	0.024	- 0.098	0.922
Category 4: BDT 40001 - 60000	0.105	0.024	4.448	< 0.001***
Category 5: Above BDT 60000	0.094	0.025	3.815	< 0.001***
Residence Location	- 0.062	0.016	- 3.886	< 0.001***
DFS Awareness	0.079	0.015	5.145	< 0.001***
Financial Training	- 0.077	0.016	- 4.712	< 0.001***
Internet Access	- 0.005	0.030	- 0.176	0.861
Smartphone Ownership	- 0.014	0.047	- 0.309	0.757
Financial Access Score	0.051	0.004	11.722	< 0.001***
Model Statistics				
R^2				0.591
Adjusted R^2				0.575
F-statistics				36.769
Degree of Freedom				19, 483
Observation (N)				503

Source: Author's own work.

*Note. β= unstandardized regression coefficient; SE- standard error. The reference categories are the first categories of Age Group, Education Level and Income Level. *p < 0.05, **p < 0.01, ***p < 0.001.*

Graphical representation of the point estimated coefficients together with the 95% confidence interval are summarized by Figure 12. The pattern is consistent with Table VII such that there are positive associations of selected income categories, Age 41-50 years, Gender, DFS Awareness and FA Score while negative associations for residence and income category BDT 10,001-20,000 against Financial Training categories. This being the unstandardized coefficients, it is in order that the values of the coefficients of two predictors measured on different scales cannot be compared.

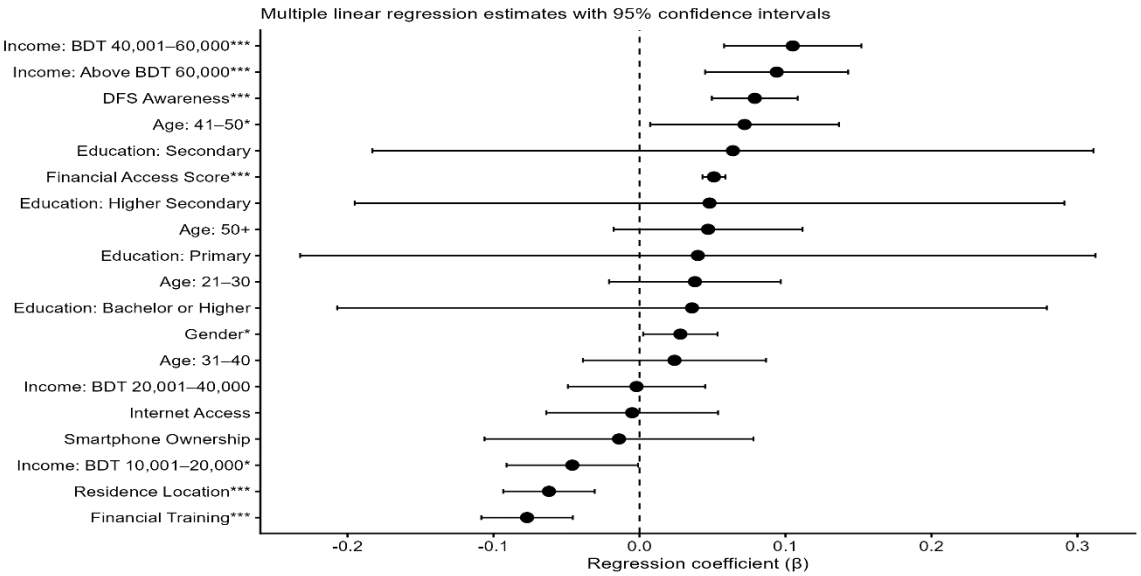


Figure 12. Regression coefficients associated with financial inclusion index

Source: Author's own work.

*Note. The points are estimated regression coefficients (β), the horizontal bars are 95% confidence intervals and the vertical dashed line is at 0 (zero association), *, **, and *** are coefficients significant at 5%, 1% and 0.1% respectively. All comparisons were carried out against the reference categories no formal education (Education), Below BDT 10,000 (Income), Under 20 (Age).*

4.6 Regression Diagnostic Results

Diagnose tests on the assumptions of the multiple linear regression model were run; there seemed no problem with multicollinearity, highest adjusted GVIF, GVIF^(1/2Df) was found as 1.369.

The Studentised Breusch-Pagan test was not significant (BP = 23.176, df = 19, p = 0.230) and thus provided no significant evidence of heteroskedasticity.

Several potentially influential observations were detected using leverage values and Cook's distance. One had a leverage value of 1, after which Cook's distance couldn't be computed, so it produced a NaN. Not being able to be omitted, because it was regarded as a valid response and didn't require censoring based on any other criterion of diagnosis, it was retained as a valid observation and didn't necessitate an adjusted analysis, but regression estimates produced were those on all of the valid entries.

5. DISCUSSION

5.1 Principal Findings

The financial inclusion for MFS users in Bangladesh has reached beyond mere access but is yet to be comprehensive in its broader view. The average FII value was 0.551 (SD = 0.185); 72.2% of the participants could be graded as being moderately to highly included with only 4.4% being very highly included. Gap in usages, affordability, quality, financial capability and security restricts complete inclusion despite financial and digital access for most people.

According to the bivariate analysis, income (r = 0.566), FA Score (r = 0.516) and DFS awareness (r = 0.427) were the key correlates for FII. The overall regression model was statistically significant and explained 59.1% of the variation in FII (adjusted R^2 = 0.575). When adjusted for other variables, however, age, gender, income, residence, DFS awareness, and financial training were associated with FII, while education, smartphone ownership, and internet access were not. A higher income, greater financial access, and DFS awareness were associated with a greater extent of inclusion, whereas a rural residence and financial training were negatively associated. The results identify a clear gap between access to financial technology and real financial inclusion. Because of the cross-sectional design, the relationships identified here need to be interpreted as associations not causal effects.

5.2 Socio-economic and Spatial Inequalities

Income was one of the strongest correlates to FII. This finding is in line with previous research on FII in Bangladesh (Chowdhury & Miraz, 2026). When a greater income is available to an individual, there is a likely higher chance of owning a financial account and paying the fees incurred from financial transactions, along with a wider array of other opportunities to use financial products. A sustained income gradient suggests that providing access to

digital financial channels will not necessarily decrease economic inequalities in financial involvement.

Rural respondents on average had lower FII than urban ones, which was consistent with evidence from persistent connectivity, digital-skill and financial-literacy constraints (Aziz & Naima, 2021; Noor *et al.*, 2026). Digital services may enable them to reduce their dependence on physical bank branches. However, differences in awareness, quality of services, skills and resources may still perpetuate geographical disparities. Gender and age remained associated with FII, once again consistent with previous work in Bangladesh (Akhter & Khalily, 2020; Chowdhury & Miraz, 2026). Digital scaling alone may therefore be not sufficient to remove differences in financial participation of demographic and geographical groups.

5.3 Digital Access, Awareness, and Financial Capability

Although 98% of respondents owned a smartphone and 95% regularly accessed the Internet, these variables were no longer significant in the adjusted model. They varied only slightly, which might help to explain why these variables lost their ability to differentiate between respondents about their level of FII. Connectivity by no means becomes less important, but when almost everyone becomes somehow connected, other characteristics might provide better explanations with differences in inclusion.

After adjustment, DFS awareness continued to have a positive association, indicating the significance of a level of understanding of available financial services as well as technology access. In agreement with Aziz and Naima (2021), the need for financial literacy and digital skills, as well as awareness, is reinforced. Education was positively associated with FII in bivariate analysis, but after adjustment, it was non-significant, and this might be because its association with income, DFS awareness, and financial access overlapped.

The financial training yields a more complicated result. Only 14% of the participants said that they received training, which does not have a significant association with FII at the bivariate level but shows a significant negative association in the adjusted model. This change has to be taken with caution. This does not say that training reduces inclusion or that it is not helpful. Differences in the characteristics of the participants, training sessions, etc., not controlled for could have contributed to the result. More research needs to concentrate on content, delivery and exposure to training.

5.4 Financial Access and Multidimensional Inclusion

Positive correlation between FA Score and FII underlines significance of access to formal and digital financial avenues. While FA Score captures only access, FII consists usage, quality & affordability, and capability & security in addition to only access. Thus, having access to multiple accounts and apps does not mean they are used effectively, affordably, or securely in a satisfactory manner.

The relatively small percentage of reaching high FII even during universal account ownership supports that it should not be considered unidimensional. Access forms the base after which there is a strong dependence of participation on quality, cost, capability, and security. Since there are overlaps between FA Score indicators and access dimension of FII, their association is suggestive, than causal evidence.

6. CONCLUSION AND IMPLICATIONS

6.1 Key Findings

This study illustrates that financial inclusion for MFS users in Bangladesh has gone beyond basic financial and digital access but is still imperfect on other dimensions of financial inclusion. Widespread usage of MFS and bank accounts, smartphones, internet connection and applications for digital finance do not automatically mean effective, affordable, secure, and capable use of financial services.

Differences in FII were statistically more associated with differences in income, wider access to finance, DFS awareness and some other geographic and demographic variables than technological connectivity. In particular, income and residence were associated with differences in financial inclusion, while the association with DFS awareness remained positive even after adjustment for other factors. By contrast, ownership of a smartphone and access to internet were not significant in the multivariable model, indicating that basic connectivity may become less important in distinguishing varying levels of broader financial inclusion among MFS users that have already widespread technological reach.

The findings suggest that there must be more emphasis on meaningful and equitable use along with continued expansion of digital access for the next phase of financial inclusion in Bangladesh to flourish. Financial and digital capability, awareness and affordability, service quality, security, and consumer protection are crucial factors influencing whether use is translated into wider financial inclusion.

6.2 Policy Implications

The findings suggest that Bangladesh's policy considerations on financial inclusion should move beyond expansion of basic access to digital financial services towards improvement of quality, affordability, security, and effectiveness of financial participation. Policymakers, regulators, and financial organizations should prioritize financial and digital literacy initiatives that equip users with practical knowledge of DFS usages, transaction costs, fraud prevention, digital security, and consumer rights.

The associations of income and residence location with FII the importance of addressing socio-economic and spatial inequalities in financial inclusion. Policy interventions should pay special attention to affordability, service usability, and digital capability among low income and rural population. As internet and smart phone penetration was already high in this sample, it is unlikely improved connectivity would have played much of a role in differences in FII amongst existing MFS users.

The prevalence of transaction fee and security concerns among the respondents further reinforces the importance of affordability, security, privacy, and the need for stronger consumer protection. Regulators and financial service providers should prioritize transparent transactions charges, reliable service delivery, data privacy, and digital security to strengthen user confidence and trust as service adoption expands.

Finally, the negative adjusted association between financial training and FII should not be viewed as evidence that training diminishes financial inclusion. Instead, it highlights the need for evaluation of the targeting, content, accessibility, and effectiveness of financial education schemes. Overall, focus at the policy-level should gradually shift away from access oriented expansion toward enabling effective, affordable, equitable, and secure use of financial services.

6.3 Limitations and Future Research

There are several limitations in the findings. Firstly, the cross-sectional design cannot establish causality. One should not interpret the association with financial training and residence as causal. Secondly, the study is limited to 503 respondents and cannot be considered completely generalizable beyond the sample. Thirdly, the self-reported information may lead to recall and response bias. Lastly, FII is a composition of chosen indicators and weighting decisions; there is potential for a different result with other measures or different weightings.

Possible directions of future research include a more robust test of theory through longitudinal, experimental or quasi-experimental study designs and use of larger, representative samples and comparisons across rural-urban, income, and various demographic areas as a way of mapping patterns of inequality. Besides demographics, future studies should also include relevant factors that comprehensively explain meaningful financial inclusion. Such factors range from one's financial literacy, to digital skills, trust, perception of security and consumer protection laws, and prior familiarity of financial products. Specifically, the negative association of financial training and FII needs to be investigated in greater depth, using study designs capable of temporal and causal tests. Validation of the FII using other indicators, weights or through qualitative research would help further research on understanding factors predicting active, secure and sustainable use of digital financial services.

7. ETHICAL CONSIDERATIONS

The study was carried out independently and did not belong to any institute. Thus, there was no ethical approval obtained. Participants were briefed and their informed consents were obtained. The participants were guaranteed anonymity and confidentiality, and they participated on their will and had the right to withdraw from the study.

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