



## Artificial Intelligence, Business Constraints, and Economic Barriers to Financial Inclusion among Rural Women in Bangladesh: A Review

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**Abstract:** The financial inclusion has been important in the poverty reduction, empowerment of women, and rural business growth in Bangladesh. Farmers, livestock farmers, seamstresses, food processors, practitioners of home-based businesses and informal service providers are the main occupations of rural women and numerous women lack easy access to formal finance. AI can help with being inclusive by offering alternative credit scoring, fraud identification, digital identity verification, customer support and enhancing the design of products. However, AI alone is not enough to eliminate exclusions. Its impact is reliant on data quality, fair models, services that are affordable, digital literacy, trust and consumer protections. The present review explores the potential of AI-powered finance for the benefit of rural women in Bangladesh as well as constraints and economic barriers to what AI could offer. The paper proposes to highlight the factors excluding rural women: its low income, absence of collateral, poor records, high service fees, inaccessibility of phones, social norms, dependency on agents, risk of fraud and data poverty. Therefore, in order to make full use of AI, it is important to adopt it as a part of broader gender-inclusive financial inclusion policy.

**Keywords:** artificial intelligence, financial inclusion, rural women, Bangladesh, digital finance, business constraints, economic barriers; fintech

### 1. Introduction

#### 1.1 Background of the Study

Financial Inclusion is having access to and utilization of affordable, safe and useful financial services. It covers payments, saving, credit, insurance, remittance and financial counseling. Inclusion is more than a banking problem for women in rural areas in Bangladesh. It is also correlated to income, dignity, family welfare, business survival and decision making power. There are rural women who are involved in agriculture, animal farming, poultry, tailoring, handicrafts, food processing and small retail. These activities are effective ones but these are very poorly documented and informal. This can result in the invisibility of women's work on the formal finance front.

Bangladesh has achieved significant strides with microfinance, Mobile Financial Services, Agent Banking, Digital Wages and Government payments. In developing economies digital finance is a key enabler of account ownership and payment utilization (World Bank, 2025). Women's account ownership is still lower than men's in Bangladesh and the gap between the women and men is approximately 20 percentage points (UNDP Bangladesh, 2025). This disparity indicates progress in the financial inclusion space, but is not found across all groups.

#### 1.2 Problem Statement

Rural women have a number of constraints from failing to participate in formal finance. They may not own land, or have any collateral or written business records or

control a mobile phone. They also might rely on their male family members and local agents to access their digital accounts. Mobile financial services can overcome the distance. But it is not always the case that it is private and secure and gives the user full control. Digital access can be without any empowering use.

In the financial sector, AI is increasingly playing a role. AI is now gaining significance in the financial industry. AI is able to analyze credit risk, identify fraud, verify identity and create personalized products for customers. These tools can be useful to women who don't have a formal credit history. But AI can also perpetuate inequality when trained on data that is biased. When women's low digital activity is considered to be their low financial value as in algorithmic systems, it can harm women.

### 1.3 Aim and Research Questions

This review aims to explore the potential of Artificial Intelligence (AI) in financial inclusion for rural women in Bangladesh and pinpoint the business restrictions and economic challenges that might hinder its impact. The review is guided by four research questions:

1. How can artificial intelligence and digital financial services support financial inclusion among rural women in Bangladesh?
2. What business constraints limit rural women's access to formal and digital financial services?
3. What economic barriers prevent rural women from using AI-enabled and digital financial services effectively?
4. What policy and practical measures can make AI-based financial inclusion more affordable, fair, and gender-sensitive?

### 1.4 Contribution of the Review

This review links three separate discussions, AI in finance, women's rural entrepreneurship and the economic exclusion. It contends that the effective contribution of AI to inclusion depends on the linkage with affordable products, trusted products delivery systems, digital literacy, fair regulation, and gender-sensitivity in designing products.

### 1.5 Research Gap

The issues of financial inclusion, microfinance, mobile money and women entrepreneurship in Bangladesh have been explored in previous studies. There are other research papers that have discussed AI, fintech and algorithmic credit scoring more in general in the financial system. But there are fewer studies that link these in one review that concentrates on women in rural areas in Bangladesh. This space is crucial as it serves as a pathway to understand the intersection of social and economic norms and circumstances, which already

inform women's access to finance, phones, records, markets and decision-making power. If a credit model fails to take into account women's informal sector activities, it is not a fair credit model. If women have to use a digital service through an agent or family member it is not inclusive. This review focuses on bridging the gap between AI opportunities and business constraints and economic barriers.

## 2. Review Method and Scope

### 2.1 Review Design

This paper has been written in a narrative review style. It is appropriate as the topic spans the areas of financial inclusion, Artificial Intelligence, Fintech, Women entrepreneurs, Rural development, Consumer protection etc. It's not measuring one single effect that is the purpose. The aim is to operationalize a discussion based on previous research and policy evidence.

### 2.2 Scope of the Review

The review is limited to the rural women in Bangladesh. Utilizes evidence specific to Bangladesh, if available. It also employs external research conducted around the world regarding AI, digital finance and algorithmic credit scoring as AI lending is still a relatively new phenomenon in Bangladesh. Financial inclusion is considered as a multidimensional concept in this paper. Having an account is crucial, but it isn't enough. Other factors include regular usage, cost, risk, and trust and control.

### 2.3 Inclusion of Sources

Information was gathered from the sources relevant to the topic of AI, financial inclusion, digital finance, economic participation of women, rural entrepreneurship and the topic of Bangladesh. Studies, official reports, policy documents and recognized development data were preferred, and peer-reviewed studies were favoured. Only older sources where they continued to be relevant to the understanding of digital credit, microfinance, or algorithmic risk are used.

### 2.4 Conceptual Framing

The review covers the potential of AI-driven financial services as a link between rural women and formal financial services. The bridge operates by alternative data, lower costs, risk check, fraud prevention and custom-made products. But the bridge is weak if women's income is low, they have no phone, weak records, low literacy, no privacy and limited control over money. To enhance inclusion, fintech is required to be regulated, have capacity in the market and consumer protection (Sahay et al., 2020).

## 3. Financial Inclusion among Rural Women in Bangladesh

### 3.1 Meaning of Financial Inclusion

Financial inclusion has to be considered in both aspects of access and real use. A bank account or mobile phone can enable women to access their wages, build savings, remittance and cope with shocks. They can also facilitate business investment. However, control does not always go hand-in-hand with ownership. A woman can own an account but don't understand the fees or make decisions on how money is used or don't even the password.

Financial inclusion plays a key role in the areas of account ownership, digital payments, savings, borrowing and resilience (Demirgüç-Kunt et al., 2022). In Bangladesh, it is essential to have a wider perspective as women's financial lives in rural Bangladesh are mixed. They can access cash, alternative sources of credit, microfinance, mobile money and family support simultaneously.

### 3.2 Current Financial Inclusion Landscape in Bangladesh

There is a diverse inclusion system in Bangladesh. The rural women have long been targeted by the microfinance institutions by providing loans in the form of groups. Services have been extended to the agent banking and beyond from urban branches. Now, making small payments is easier with mobile financial services. The government transfers and wages are also being transferred digitally.

The National Financial Inclusion Strategy (NFIS) 2021 highlights the importance of women, rural people, small enterprises, financial literacy, digital finance, consumer protection in Bangladesh (Bangladesh Bank, 2021). This policy recommendation is valuable as it is not only due to the lack of banks, but due to the exclusion of women. There are other causes of inadequate capability, lack of trust, inappropriate products and limited data.

The mobile financial services have grown rapidly. There were 237 million registered MFS accounts in Bangladesh by December 2024, with 41.6 percent of the accounts held by women (Transparency International Bangladesh, 2025). This demonstrates great market penetration, but not necessarily equal usage. At that time, only 37.6% of the registered accounts were active (Transparency International Bangladesh, 2025). The results indicate that easier to open than to use.

### 3.3 Rural Women and the Gender Gap

Access to finance is still significant, but not as much as the gender gap. Income, education and access to telephones, family rules and social expectations all influence women's inclusion in Bangladesh. A number of women are paid into their account and then they pull out the cash in a rush for the family's needs. Other

people use agents or relatives since they do not trust in using mobile menus.

Digital financial inclusion requires more than just the provision of technology in rural areas. Digital finance (DF) is used depending on the social relations, trust, knowledge about the services, and local power dynamics (Aziz & Naima, 2021). Important because rural women decision on finances could be dependent on husbands, parents-in-law, agents within the community, employers or community norms.

### 3.4 Mobile Financial Services and Agent Banking

Mobile financial services can shorten the travel time and provide small transactions as well. They assist women in getting remittance payments, wages, government transfers and customer payments. The benefits of agent banking may also be to bring services closer to the villages. The channels are significant when there is a lack of bank branches.

However, mobile services can engender new dependency. If a woman cannot use an app/ USSD menu, she can use the phone for her by handing it to an agent. This decreases privacy and opens the door for additional fees or charges to be levied. Service knowledge, users confidence and transaction procedure are some of the challenges for rural users in Bangladesh (Rahman, 2021).

### 3.5 Measuring Real Inclusion

Having an account is not a good indicator of real inclusion. Signs and indicators to consider are active accounts, women in control of accounts, women saving, access to safe borrowing, women complaining about the service, confidence in digital technology, and coping with shocks. The following indicators are pertinent because it is possible for rural women to consume both formal and informal services at the same time. Although a woman has a mobile account, she may like cash as there are no shops or family members or suppliers who accept mobile payments. Therefore, access and use should be taken into account in the measurement.

## 4. Artificial Intelligence and Digital Financial Services

### 4.1 Use of AI in Financial Services

AI is the ability of systems to recognize patterns, classify information, predict risk and assist decision making. AI is applied in finance in the area of credit scoring, fraud detection, customer service, digital KYC, insurance pricing, transaction monitoring, product targeting. These can be used to help improve the efficiency of small value services.

AI is crucial to inclusion because there are people who are excluded who don't have formal records. While salary slips, bank statements, collateral, tax files and

credit histories are common requirements for traditional banks. These documents may not be available for rural women. Alternative data can be used to detect cash flow patterns, payments, savings, mobile money usage and business activity, using AI. If there is relevant data and if it is well-tested, machine learning can enhance the credit risk assessment process (Bazarbash, 2019).

#### 4.2 Alternative Credit Scoring

AI applications that help rural women such as alternative credit scoring are incredibly beneficial. It can rely on transactions on a mobile phone, payments for utilities, payments to suppliers, payments history and digital sales records. It can be useful for lenders to understand and value those who are active in business but not visible in traditional credit systems who are women.

A registered firm does not necessarily exist if the rural woman, who sells eggs, vegetables, clothes, cooked or ready to eat food is a rural woman. Her income might be regular, via payment via mobile phone or a digital account. However, if AI is able to read these small patterns relatively, she could get the credit without putting up any land collateral. So, there is a way to de-emphasize formal documentation with alternative data.

Alternative scoring must be taken care, though. Without good information, you can get bad decisions. Costs of using cash or sharing a phone may not be recorded if a woman uses cash or shares a phone. The model may not have any knowledge of the business patterns of women, if it is based on the data of the major part of the customer base is male.

#### 4.3 AI-Based Fraud Detection and Customer Protection

There are many other uses of AI, including fraud detection. Rural women who are not confident of their digital abilities can encounter fraudulent calls, PIN theft, false messages, agents abusing their authority and unauthorized cash-out. AI can identify odd transaction behavior, repeated failed logins, unexpected cash-outs or odd behavior by the agent. This can help to preserve the user's assets before losses start to be significant.

Trust is the main element of consumer protection. If women lose money via fraud, they might cease to make use of electronic finance. They can also be a barrier to other people in the community. With the help of artificial intelligence, alerting, voice warnings, transaction restrictions and easy complaint procedures can enhance safety.

#### 4.4 Digital KYC and Customer Support

AI can help with digital KYC in reading identity documents, matching faces, form-checking, and detecting form errors. This can help cut down on time to

open an account and branch visits. Onboarding could be streamlined and less costly to benefit rural women. However, digital KYC can also turn down customers if documents are ambiguous or photos aren't of high quality or if their names are misspelled.

Customer support can also be an advantage with the aid of AI. Chatbots and voice systems can clarify charges, what's due dates, saving objectives, and fraud risks. Apps may be more useful for rural women than those that rely on text, since a voice-based Bengali support might be helpful. The design of the user's application should be based on the values of users including safety, trust, independence and social acceptance (Shams et al., 2021).

#### 4.5 AI for Gender-Sensitive Product Design

AI can enable financial service providers to grasp the customer's needs. It can detect saving trends, business cycles, when to pay and risk trends. This can provide for flexible loans, small savings plans, livestock insurance, emergency financing, and financing working capital.

The potential is that AI could be leveraged primarily as a tool for increased credit sales. Doing the 'right thing' with inclusion does not necessarily equate to 'pushing debt' onto poor women. While digital finance can help to increase access, it can also raise the debt burden when loans are made too available (Yue et al., 2022).

### 5. Business Constraints Affecting Rural Women's Financial Inclusion

#### 5.1 Small and Informal Business Structure

There are a lot of small and informal businesses in rural areas, which are managed by women. These activities tend to be at home and intermingled with domestic duties. Women can be engaged in local trade, animal husbandry, food processing, clothing making or farm activities. The business can have an income but it might not be licensed, have an account of its own, records or a formal address.

There is informality which presents barriers. These activities might not be considered as good businesses for banks. Loan officers might favor registered business entities which have apparent shops and paperwork. The rural women's employment can thus be economic but not financial.

#### 5.2 Lack of Collateral and Business Records

One of the significant challenges for women is collateral. Men have traditionally been the head of households, and they tend to own land and big assets. Women can contribute to the family's wealth, but their names may not be on the title deeds to the property. This reduces the availability of formal sources of credit.

Social, cultural, financial and skill-related challenges are the issues faced by the rural women entrepreneurs in Bangladesh (Rahman et al., 2023). These challenges are greater because of a lack of collateral and weak documentation. Many women don't also have records of sales, costs, stock and profit. They may also be deemed too risky by the absence of records if they do not exist.

### 5.3 Limited Market Access and Business Networks

Exclusion through credit alone is not the answer to business exclusion. Aside from the other needs, the access of market, buyers, transport, suppliers, storage, and price information are also needed for rural women. A woman can get a loan and yet not be able to sell the products at a fair price and so cannot grow.

Access to the Internet and marketing skills are required, as it can be used to connect with customers, but especially women. Social limitations on women travelling and negotiating are also a problem for many women in the rural areas. Financial inclusion should thus be related to business training, market linkage and support from cooperatives.

### 5.4 Time Poverty and Household Responsibilities

An invisible constraint of business is time poverty. Childcare, cooking, caring for elderly, domestic duties, support of farming and earning a living is often done by the rural women. This leaves few opportunities to go to the bank, train the employees or plan the business.

Mobile finance can cut down travel times, but it has to be facilitated easily. Products that need to be revisited, completed with a lot of forms and/or have to be bought on a specific day might not be suitable for women's lives. Services should then be flexible and should be accessible via trusted local means.

### 5.5 Digital Skills and Agent Dependency

Financial Use is strongly related to Digital Skills. Even a woman can get access to a phone, but have some doubts about menus, PIN, OTP, app and charges on transactions. The lower the confidence the more one is dependent on agents. This reliance may make for less privacy and control.

In Bangladesh, trust, perceived risk, usefulness and convenience (Uddin & Begum, 2023) are the factors that influence mobile banking adoption. Rural women are particularly likely to be affected by these factors as when an experience is negative it may decrease their future use. Thus, training has to be hands-on and reiterative.

### 5.6 Product Mismatch and Weak Business Confidence

Many financial products are not geared towards the business cycles of rural women. Fixed repayments can

not always coincide with the seasonal income. The standard loan sizes could be higher or lower than you need. Some savings instruments do not allow for small and regular deposits.

Business confidence is additionally crucial. Some ladies may steer clear of financial institutions due to the fact they believe they will be turned down. Some people think it's not a world of business for the likes of them. This fear can be minimized by agents that are women-friendly, female field officers and community demonstrations.

## 6. Economic Barriers to Financial Inclusion

### 6.1 Low and Irregular Income

Low income is one of the direct hindrances to financial inclusion. A woman would like to save, but will have no money left over for food, medicine, school, and paying debt. This problem can't be addressed through account ownership. In developing economies, a lack of funds is still a significant barrier to not having an account (World Bank, 2025).

The earning too is not regular. Seasonal income, crop cycles, health shocks, floods and price fluctuations are faced by the rural households. Small amounts of income at different times may be earned by a female. This may not be the typical loan repayment history.

### 6.2 High Transaction Costs and Service Fees

Bad users might be deterred by service fees. All of the above are factors to consider when it comes to cash-out charges, transfer fees, loan processing fees, mobile data costs and travel costs. Such costs can seem insignificant to providers but are relevant to women who do small transactions.

Trust is also impacted by the high costs. Women not knowing what the fee is may feel cheated from the service. There is therefore a need for transparency in displaying fees. Financial inclusion is about access and affordability and transparency.

### 6.3 Cost of Mobile Phones and Internet Access

When it comes to finance, AI frequently takes it for granted that users will have a digital-access platform. In fact, a large number of women in rural areas are using the basic phones or shared phones. The cost of the smart phones, internet data, charging and repairs can be costly. In LMIC countries, females are less likely than males to be using mobile internet (GSMA 2025).

While the income gap may be a significant factor, there are other reasons for the gender gap in mobile internet use. It's also a literacy issue, a safety issue, a relevance issue, a family-approval issue and a confidence issue.

Women's digital accessibility is less than men's, particularly in rural areas of Bangladesh (GSMA, 2024).

#### **6.4 Household Control over Women's Income**

Access to the financial markets does not necessarily lead to control over these markets. Women can also earn wages, remittances and/or loans; however, men can make decisions for the household. A micro loan can be loaned to the woman's name and the husband/relative can use it. This undermines the connection of inclusion and empowerment.

Although microfinance can provide a social empowerment to women it is not necessarily economic nor political (Pervin et al., 2023). This lesson will be essential for finance that is based on AI. Women's digital credit will not empower women if they do not have control over the money.

#### **6.5 Debt Pressure and Economic Shocks**

Rural women can take loans from multiple sources simultaneously. Women may be able to take loans from multiple sources at one time in rural areas. These comprise the informal lenders, neighbors, relatives, shops and MFIs. Digital credit could be an additional line of credit. Women might end up borrowing for their immediate needs and not productive investments if the credit is too readily given.

This risk is heightened in the event of an economic shock. A fall in health or sickness, flooding, loss of crops, rising prices and joblessness can diminish the ability to repay loans. AI systems can identify the risk, but they don't need to take pleasure from women for a short-term shock. Grace periods, flexible repayment options, savings and insurance should be considered responsible finance.

#### **6.6 Data Poverty in AI-Based Financial Systems**

One new challenge in the AI finance realm is data poverty. Digital data is the fuel for AI systems, which are essential for decision-making. Poor rural women may not have many digital footprints as they use cash or share phones/agents. This can cause them to not be seen by algorithms.

While everyday data can become credit data, with alternative credit scoring comes opportunity and risk (Aitken, 2017). If women don't have digital records, that could lead to the exclusion of their voices once more. Data producers can risk their privacy if the production is by women. That's why, data governance should be included in inclusion policy.

### **7. Risks and Limitations of AI-Based Financial Inclusion**

#### **7.1 Algorithmic Bias and Gender Inequality**

AI can reproduce gender inequality when training data reflect unequal access to finance. If men have more formal accounts, higher transaction volume, and stronger asset records, models may treat male patterns as normal. Women may receive lower scores because their financial lives are less visible.

Algorithmic credit scoring raises concerns about fairness, privacy, and consumer protection (Aggarwal, 2021). Credit scores may disadvantage women even when risk is controlled (Liu & Liang, 2025). This risk is serious for rural Bangladesh because gender gaps already exist in income, assets, phone access, and formal records.

#### **7.2 Privacy and Data Protection Risks**

AI-based finance often uses personal data. This may include transaction history, phone data, location, contacts, device information, and app behavior. Such data can reveal sensitive information about women's income, mobility, relationships, and business activity.

Privacy is important for rural women because household and community control can be strong. Data misuse may create family conflict, fraud, or social harm. Consent should be clear, simple, and meaningful.

#### **7.3 Lack of Explainability in Credit Decisions**

It can be challenging to explain AI decisions. It's possible for a woman to be denied a loan even if she doesn't understand. She could also be offered a high interest rate for which she has no knowledge of the reason. This gives rise to mistrust and complaints are more difficult.

The need for explainability in the context of fair finance. The main reasons for rejection should be known by the customers. They ought to also be able to fix incorrect data. High cost customers should use an automated system, but low cost customers should have the option of human review since there are times when automated systems can make mistakes.

#### **7.4 Digital Fraud and Over-Borrowing Risks**

Digital fraud has the power to defuse trust in financial services. Women living in rural areas might receive fraudulent calls, incorrect messages, fraudulent representatives and fraudulent transactions. While AI is important for spotting fraud, it won't be the sole method for improving user education and robust complaint mechanisms.

Another risk is "over-borrowing." While AI can identify customers that might be able to make loans, this doesn't mean that loans are certain. Loan growth isn't the only measure of inclusion. It should be gauged in terms of women's control, strength, saving and safeguarding against harm.

## 8. Policy and Practical Recommendations

### 8.1 Gender-Sensitive AI Governance

There is a need for gender responsive AI regulation in the financial sector in Bangladesh. Gender outcomes should be a part of the credit model testing. Transparency in complaint handling, human oversight, privacy protections and fairness checks are all rules that regulators should impose. Data should be collected and analysed by sex to track for equal benefits for women.

### 8.2 Affordable and Flexible Financial Products

Financial products need to be in line with rural women's cash flow. Alternative loans such as small savings, emergency loans, finance for livestock, seasonal repayments, micro-insurance and working capital might be more effective than conventional loans. The fees should be transparent and not be too high for small amounts.

### 8.3 Digital and Financial Literacy Support

Digital literacy should be hands-on and for repetition. Training should be conducted on PIN safety, red flags for fraud, fee calculation, how to use the app, complaint handling and how to keep basic records of the business. This training can be supported by local women's groups (women committees), NGOs, schools, union digital centers and female agents.

### 8.4 Women-Friendly Agent Networks

Agent networks are also available and can be enhanced to be more women friendly which can help build trust and privacy. There should be an increase in the number of female agents in rural areas. Fees should be prominently displayed, receipts issued and agents should never take on any responsibility for having access to customer PINs. AI monitoring can be used to detect suspicious activity from agents.

### 8.5 Institutional Partnerships

There is no magic bullet solution that can be achieved in rural women's exclusion by any one institution. Products are under bank regulation. MFIs have community reach. Digital tools are available for fintech companies. NGOs have experience of trust and training. These strengths can be shared among partnerships. Do not let AI replace human networks, they should complement them.

## 9. Conclusion

Artificial intelligence can play a role in promoting financial inclusion for Bangladesh's rural women, it can't solve all the problems. Business constraints, economic barriers, social norms, digital gaps and trust issues are all a rural woman will have to overcome if she's trying to run a business. When used responsibly, AI has the potential to streamline credit scoring, safeguard against

fraud, enhance customer service, and contribute to the improvement of product design. It can also increase exclusion because of skewed data and high costs of services, as well as lack of clarity on the decisions. A more robust strategy should incorporate AI and low-cost products, financial education, women friendly agents, fair regulation and consumer protection. Safe use, control and resilience are all parts of the equation of real inclusion and so is economic opportunity. Additionally, field studies, interviews, and transaction data can be used to conduct a more in-depth exploration of women's personal journeys with AI-powered finance in the future. This type of evidence can demonstrate if digital products bring more control to women or simply add more accounts but have no impact on the power of women in everyday financial transactions within rural communities.

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