

Factors Influencing the Role of Fintech in Promoting Financial Inclusion in Developing Economies a Research on Bangladesh Perspective

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Abstract: The objective of this study was to explore the key factors influencing the role of Fintech in promoting financial inclusion in Bangladesh with special focus on the barriers, drivers and opportunities offered by digital financial services. Based on the study findings, it is evident that Fintech has a huge potential to bridge the financial inclusion gap in Bangladesh, but certain challenges need to be overcome to achieve a widespread and comprehensive impact. Financial awareness, a fundamental component of economic growth and poverty reduction, remains a significant challenge in many developing countries, including Bangladesh. Fintech has emerged as an innovative tool to bridge the financial gap with innovative technologies and solutions. Taking into account Bangladesh's interesting socio-economic environment, this study explores the factors influencing the role of Fintech in promoting financial awareness in Bangladesh. Key factors examined include technology infrastructure, management systems, financial literacy, trust, transparency, and fairness. The study also highlights challenges facing fintech adoption, including limited internet access, cybersecurity concerns, and resistance to change. Using both subjective and quantitative methods, the study explores how fintech platforms, such as mobile financial services, digital payment systems, and microcredit platforms, can help increase access to financial services for the unbanked and underbanked. The findings suggest that fintech has made great strides in promoting financial inclusion in Bangladesh, but targeted interventions in planning, training, and infrastructure are essential to maximize its impact. The study provides key insights for policymakers, fintech providers, and development organizations to leverage fintech for inclusive financial development in Bangladesh.

Key words: Fintech, Bangladesh, MFS, Urban, Rural, bKash, Rocket, Nagad, Influencing, Blockchain.

I. Introduction

Access to affordable and appropriate financial services for individuals and businesses is critical to boosting economic growth and reducing poverty, especially in developing countries. Despite its importance, financial constraints remain a major challenge in countries like Bangladesh, where geographical, socio-economic and infrastructural barriers mean a large portion of the population relies on formal financial services to store their funds. According to the global Findex database (World Bank, 2021), around 31% of adults in Bangladesh remain unbanked, highlighting the importance of bridging the gap in financial inclusion. In this environment, financial technology (fintech) has proven to be an effective enabler of financial inclusion by leveraging innovative technologies such as mobile banking, digital payments, peer-to-peer lending and blockchain solutions. Fintech circumvents traditional limitations on storing money and provides more accessible and cost-effective financial services to underserved populations. For example, Mobile Financial Services (MFS) such as bKash and Nagad have revolutionized financial transactions in Bangladesh by making bank account management available even in remote areas with limited physical infrastructure (Kumar & Sinha, 2020). The success of fintech in promoting financial inclusion depends heavily on technology infrastructure, governance environment, financial literacy, trust and security, equity and availability. By analyzing the challenges and opportunities present in the Bangladesh market, this study aims to provide key insights for policymakers, fintech providers and partners in formulating comprehensive financial development strategies. Through this analysis, the study highlights the transformative potential of fintech in bridging the financial inclusion gap while highlighting the need for collaborative efforts to overcome barriers that hinder widespread adoption of fintech in Bangladesh.

II. Literature review

The rapid development of financial technology (Fintech) has attracted significant academic and practical interest due to its potential to foster financial inclusion, especially in developing countries such as Bangladesh. This article analyzes current research on key factors influencing the role of Fintech in promoting financial inclusion in Bangladesh, focusing on technical, managerial, socio-economic and regulatory measures. The article highlights the transformative potential of Fintech in promoting financial inclusion in Bangladesh. However, to fully realize this potential, challenges related to technological infrastructure, governance, financial literacy, trust and socio-cultural boundaries need to be overcome. Supportive research is needed to develop comprehensive strategies that integrate technology, planning and training to form an inclusive financial ecosystem.

Technological Infrastructure:

Strong technological infrastructure such as internet access and mobile networks can be a key factor in the adoption of fintech. Studies have highlighted the increasing penetration of mobile phones and smartphones in Bangladesh as a key driver of mobile financial services (MFS) such as bKash, Nagad, and Rocket, which have revolutionized rural payment systems and small-value transactions (Rahman et al., 2020). However, limited internet access in rural areas and digital literacy among certain demographic groups remain key barriers (Ahmed et al., 2021). Therefore, improving technological infrastructure, especially in developing countries, is essential to expand the reach of fintech adoption.

Regulatory Environment:

Regulatory frameworks play a key role in creating a conducive environment for the development of fintech while ensuring customer security and system stability. In Bangladesh, the central bank (Bangladesh Bank) has issued regulations to regulate mobile financial services and digital payment systems to foster growth in the sector (Islam & Sarker, 2022). However, concerns remain about administrative fragmentation and the need for stronger approaches to address evolving challenges such as fraud prevention, data security, and interoperability across platforms (Chowdhury & Zaman, 2021).

Financial Literacy and Awareness:

Low financial literacy among the population can be a major barrier to choosing Fintech services in Bangladesh. Many potential customers, especially at the national level, want to be aware of the benefits and features of Fintech services (Kabir et al., 2020). Educational measures such as digital literacy campaigns and user-friendly Fintech platforms are considered important to bridge this gap (Ahmed & Rahman, 2021). Improving financial literacy will not only promote choice but also increase trust in digital financial services.

Trust and Security:

Trust in fintech platforms is likely to be a recurring theme in the literature. Concerns about privacy, cybersecurity, and extortion are regularly cited as major barriers to widespread adoption of fintech (Hossain & Akhter, 2021). For example, people in rural areas tend to rely heavily on cash-based transactions due to fears of advanced extortion and the need for a lawful plan of action. Researchers recommend that fintech providers should prioritize transparency, customer education, and strong security measures to build trust and increase interest in advanced home bionic systems (Islam et al., 2022).

Accessibility and Affordability:

Affordability and accessibility of fintech services are key to their success in driving economic benefits. Studies have found that fintech platforms in Bangladesh, such as mobile money saving and microcredit solutions, have significantly reduced transaction costs and increased accessibility for low-income earners (Rahman et al., 2021). However, challenges remain in adapting services to the needs of marginalized groups such as women and rural areas. To improve accessibility, policy measures to fund fintech services and promote gender-responsive financial products are recommended (Khan & Yasmin, 2020).

Social and Cultural Factors:

Social norms and structures also influence the choice of fintech services. For example, women in Bangladesh face greater financial aversion due to socio-cultural barriers limiting their access to financial services (Begum et al., 2021). The study highlights the importance of developing fintech solutions that address gender challenges, such as promoting women-centric financial products and encouraging digital awareness through targeted outreach programs.

Empirical Studies on Bangladesh:

Empirical studies show that fintech is having a positive impact on Bangladesh's financial market. For example, mobile financial services have helped rural people gain better access to loans, investments, and insurance (Karim & Akter, 2020). Moreover, digital platforms have allowed micro, small and medium-sized enterprises (MSEs) to access credit more easily, stimulating entrepreneurial activity and economic growth (Islam et al., 2021). However, analysts warn that the benefits of fintech are unevenly distributed, with people from rural and marginalized areas still facing significant barriers.

Application of dependent and independent variables:

- ♦ In examining the factors influencing the role of fintech in raising economic awareness in developing countries, particularly Bangladesh, complementary and independent factors play a central role in organizing the analysis. These elements help in building linkages, assessing impacts, and identifying variables that promote or hinder economic attention from fintech.
- ♦ **Dependent Variable:** The result or the essential calculate being examined, which changes in reaction to varieties within the free factors. In this think about: In this research:
 - Financial Consideration
 - Access to financial service area

- Utilization of financial facilities
- Depth of financial enclosure
- ◆ **Independent Variables:** The influences that potentially impact or drive changes in financial enclosure. For this research:
 - Technological Structure
 - Regulatory Background
 - Financial Literateness
 - Faith and Safekeeping
 - Affordability of Fintech Service area
 - Socio-Cultural Influences
 - Demographic Aspects

Hypotheses development

- ◆ Hypothesis (H1): Availability of Fintech circumstantial and Financial Enclosure
- ◆ Hypothesis (H2): Socio-Economic Influences and Implementation of Fintech
- ◆ Hypothesis (H3): Mobile Internet Infiltration and Financial Insertion
- ◆ Hypothesis (H4): Direction of Regulation and Financial Enclosure
- ◆ Hypothesis (H5): Financial Proficiency and the application of Fintech
- ◆ Hypothesis (H6): Confidence in Digital Financial Service area
- ◆ Hypothesis (H7): Effect of Fintech on Females' Financial Enclosure
- ◆ Hypothesis (H8): Peer-to-Peer (P2P) Advancing and Financial Insertion
- ◆ Hypothesis (H9): Fintech and Insignificant Commercial Financing
- ◆ Hypothesis (H10): Mobile Currency and Payments

Research questions

In this study, within the context of Bangladesh, firstly, has formed the central inquire about surveys. And besides, has formed the survey for supplementary investigate.

- ◆ Central research questions:
 - What are the contemporary circumstances of Fintech in Bangladesh?
- ◆ Supplementary research explorations:
 - What are the significances of the PESTLE evaluating of Fintech in Bangladesh?
 - What fluctuations are required to adopted the growth of this segment?

IV. Research Methodology

This research methodology provides a systematic approach to examine the variables influencing the role of Fintech in promoting household inclusion in Bangladesh. This section describes the research design, data collection strategy, testing methodology, and research strategy to obtain a comprehensive understanding of the topic.

- ◆ **Research Design:** This study employs a mixed-method method, compounding both qualitative and quantitative research approaches.
- ◆ **Research Objectives**
 - To categorize the key factors influencing fintech implementation in Bangladesh.
 - To observe the influence of the aspects on financial enclosure.
 - To evaluate the role of socio-economic and governing surroundings in formative fintech progress.
- ◆ **Data Collection**
 - Primary Data: Surveys, Interviews, Focus Groups

- Secondary Data: Reports and databases
- Ethical Considerations: All participants were informed about the study's persistence.

V. Factors Influencing the Role of Fintech

To better understand the role of fintech in promoting financial marginalization in Bangladesh, specific information on the various variables that influence adoption and usage patterns is essential. This data typically consists of statistics on the penetration rate of mobile financial services, user demographics, and financial performance of various segments of the population.

Penetration of Mobile Financial Services (MFS): In Bangladesh, the extensive implementation of mobile financial services (MFS), such as bKash, Nagad, and Rocket, has been pivotal in driving economic enclosure.

- **bKash (BRAC Bank):** Over 50% of Bangladesh's mature residents usages bKash, with the rural adoption accountancy for 45% of the user base. (Bangladesh Bank, 2023). Over 60 million active contributors that is the 50% of the mature residents in Bangladesh.
- **Nagad (Bangladesh Post Office):** As of 2023, over 20 million active contributors.
- **Rocket (Dutch-Bangla Bank):** Over 15 million active contributors.
- **Mobile financial services penetration:** As of 2022, the total quantity of MFS accounts in Bangladesh touched roughly 160 million (Bangladesh Bank, 2022). As of 2023, around are over 160 million active MFS accounts in Bangladesh (Bangladesh Bank, 2023). This is a significant growth from 125 million in 2021.
- **Growth rate:** The use of mobile currency raised by 30% between 2021 and 2022, reflecting enhanced adoption crossways numerous demographic groups. (Bangladesh Bank, 2022).
- **Annual transactions:** In 2022, the total value of transactions concluded mobile financial service area touched BDT 10 trillion (roughly USD 94 billion) (Bangladesh Bank, 2023).

Internet and Mobile Connectivity: The role of technology substructure is crucial in empowering the fintech acceptance. The data highpoints the level of mobile network exposure and internet infiltration, which influences the approachability of fintech service area.

- **Internet penetration:** Bangladesh's internet penetration rate viewpoints at around 70% in urban zones but drops pointedly to around 40% in rural zones (World Bank, 2022).
- **Mobile network coverage:** Mobile phone usage has touched nearly 100% in urban ranges, with 90% of rural Bangladeshis having contact to mobile phones. However, 3G and 4G network accessibility is still restricted in many rural areas, affecting fintech facility transfer.
- **Smartphone penetration:** Smartphone ownership is growing, with 60% of the residents in city areas maintaining smartphones, while only 35% of rural users have contact to these devices.

Financial Inclusion Rates: Financial enclosure rates in Bangladesh have pointedly enhanced due to the growth of fintech.

- **Bank account penetration:** Affording to the Bangladesh Bank (2022), 56% of the mature residents has a formal bank account, which comprises the mobile banking financial records.
- **Unbanked population:** In spite of development in financial enclosure, 20% of the residents remains unbanked or underbanked, with the mainstream residing in rural expanses.
- **Mobile account ownership: 70% of Bangladeshis** now have a mobile account, making mobile financial services one of the utmost broadly used methods of banking, mainly in underserved expanses.

Socio-Demographic Factors: Data interrelated to demographic influences shows distinct shapes of fintech adoption based on the age, gender, education, and income level.

- **Age:** The younger demographic (ages 18-35) is the maximum likely to adopt fintech services, with 80% of young adults by means of mobile financial services associated to only 45% of persons over 50 years (Rahman et al., 2020).
- **Gender:** Male users dominate mobile financial facilities, with 65% of bKash handlers being male, but female adoption is rising, particularly through targeted initiatives by providers like bKash, which now has 35% female users (Bangladesh Bank, 2023).
- **Income levels:** Low-income groups aspect affordability encounters, with 45% of users in the low-income bracket citing high transaction fees as a boundary to usage (Kabir et al., 2020).

- **Education:** Educated personalities with developed literacy levels display a higher rate of implementation. About 70% of users with a college degree use mobile financial facilities associated to only 35% of users with lower stages of education (Islam & Sarker, 2022).

Regulatory Environment and Policy Impact: Data correlated to the governing context and its impact on fintech adoption is crucial in understanding its influence on financial enclosure.

- **Regulatory oversight:** The role of Bangladesh Bank in setting clear controlling guiding principle has pointedly greater the growth of fintech. The Mobile Financial Services (MFS) Directive 2018 has helped create a protected environment for mobile money services, which backed to 40% development in user adoption amid 2021 and 2022.
- **Financial Literacy and Awareness:** As of 2022, around 20% of the population informed having a basic considerate of mobile financial facilities, and efforts to growth financial literacy are in progress through government agendas and fintech partnerships.

Trust and Security Concerns: Safekeeping and confidence in fintech platforms keep on a critical reason:

- **Fraud and cybercrime:** Security apprehensions such as fraudulent transactions and data fissures have been quoted by 25% of users as a most important deterrent to enlarged usage (Rahman et al., 2021).
- **Perceived security:** Around 70% of users direct self-confidence in conventional fintech platforms like bKash, which have invested in progressive security structures like biometric verification and two-factor verification (Hossain & Akhter, 2021). Nevertheless, less important fintech businesses face challenges in gaining user faith due to restricted safety resources.

Impact on Financial Inclusion:

- ♦ The adoption of fintech has had a substantial impact on enlightening the financial insertion in Bangladesh.
- **Access to credit:** A study by Bangladesh Bank (2022) disclosed that 22% of fintech users now have entree to microcredit or personal loans over mobile platforms, empowering them to take part more dynamically in the economy.
- **Remittance services:** 40% of remittances are now transferred via mobile money facilities, simplifying more manageable and affordable cross-border money handovers, particularly for the migrant workforces and their relatives (World Bank, 2022).
- **Savings and insurance:** Mobile-based savings accounts and micro-insurance products are now available to a grander portion of the residents, with 15% of MFS users contributing in such products (Bangladesh Bank, 2023).
- **Challenges and Barriers:** In spite of the development, several fences remain for fintech implementation:
 - ♦ **Transaction fees:** 45% of low-income users cited high transaction fees as a barrier to retrieving the mobile financial services (Kabir et al., 2021). Reducing transaction charges, particularly for small transactions, could increase implementation.
 - ♦ **Digital divide:** The rural-urban divide in internet and mobile access leftovers substantial, with rural residents facing barriers related to both affordability and consistent connectivity.
 - ♦ **Financial inclusion of women:** Only 35% of females in Bangladesh have entree to mobile financial facilities. The gender gap is the mostly wide in rural areas due to cultural and enlightening barriers (Begum et al., 2021).

Opportunities for Blockchain in FinTech in Bangladesh

Blockchain technology is transforming the financial sector internationally, and its practices in Bangladesh holds immense thinkable. While the country is still in the primary stages of implementing blockchain, there are substantial prospects and challenges in smearing this expertise for the FinTech trade.

- **Digital Transactions and Financial Enclosure:** Blockchain-based transactions structures can increase more openness, productivity, and safekeeping in digital money flow. Bangladesh has a substantial unbanked resident (Han, Li, He, Wu, Xie and Baba, 2018). Blockchain could help in providing safe, reorganized financial services to rural and underserved ranges. MFS like bKash, Rocket and Nagad could participate blockchain to decrease fraud and progress money supply speed.
- **Cross-Border Transactions:** Blockchain can transmute remittance service area, which is the key for Bangladesh as it is one of the largest beneficiaries of transmittals worldwide. Blockchain can enable real-time, low-cost cross-border transactions, reducing reliance on mediators (Ibba, Pinna, Seu and Pani, 2017).

- **Fraud Prevention and Transparency:** Blockchain's absolute ledger can combat fraud in financial dealings. It safeguards transparency in loan payment, government appropriations, and tax collection structures (Tripathi, Nautiyal, Ahad and Feroz, 2021).
- **Smart Contracts in Banking:** Blockchain-powered smart conventions can systematize financial arrangements like loans and insurance claims, reducing paperwork and growing proficiency (Labazova, Dehling and Sunyaev, 2019). Banks in Bangladesh could use smart agreements to make simpler developments like trade finance and letters of credit.
- **Microfinance and SME Financing:** Blockchain can make simpler access to recognition for small and medium enterprises (SMEs) and individuals. Peer-to-peer advancing stages using blockchain can create trust and transparency between borrowers and investors (Fridgen, Regner, Schweizer and Urbach, 2018).
- **Supply Chain Finance:** Blockchain can make available end-to-end openness for supply chains, which is unsafe for financing in segments like Ready-Made Garments and cultivation, two of Bangladesh's commercial pillars.

Challenges in Adopting Blockchain in Bangladesh

- **Regulatory Uncertainty:** Bangladesh has strict principles against of cryptocurrencies corresponding of Bitcoin. The deficiency of clear strategies on blockchain use in FinTech creates hesitation amongst industries and stockholders (Fridgen, Regner, Schweizer and Urbach, 2018). The central bank (Bangladesh Bank) has not yet implemented blockchain-specific outlines.
- **Lack of Awareness and Expertise:** There is restricted considerate of blockchain technology among contributors, including banks, policymakers, and customers. A deficiency of expert professionals in blockchain growth and administration.
- **Infrastructure Restrictions:** Blockchain technology entails robust digital structure. Bangladesh faces encounters like low internet infiltration in rural areas and untrustworthy power supply.
- **Cybersecurity Risks:** While blockchain is protected, its combination with existing structures could familiarize exposures. Scams and fraud in the cryptocurrency space may incumber faith in blockchain resolutions.
- **Charges Execution:** Implementing blockchain resolutions take in substantial initial outlay in hardware, software, and training.

Current Blockchain Developments in Bangladesh (Bangladesh Bank, 2023)

- **Government Approaches:** Bangladesh is searching blockchain applications through initiatives like the a2i (Access to Information) database to improve governance and facility transfer.
- **Private Sector's Initiatives:** Some private Banks and financial organizations are opening to explore blockchain applications for enlightening proficiency in trade finance and outflows.
- **Global Partnerships:** Bangladesh is engaging with global establishments like RippleNet and Stellar for remittance facilities powered by blockchain.
- **Academic and Research Initiatives:** Universities and tech institutes in Bangladesh are initial to comprise blockchain in their study and training agendas.

Way Forward

- **Regulatory Framework:** Bangladesh Bank and legislators need to launch a clear governing context for blockchain, distinguishing it from cryptocurrencies.
- **Relationship and Training:** Partnerships between the government, private area, and enlightening foundations to progress a blockchain talent pool. Global association to learn best performs and implement blockchain resolutions.
- **Pilot Projects:** Inauguration the specific segments like remittance, microfinance, and supply chain finance to more validate blockchain's potential (Fridgen, Regner, Schweizer and Urbach, 2018).
- **Public Consciousness Campaigns:** Educating commerce and personalities about blockchain's paybacks and applications.
- **Strengthening Digital Substructure:** Investments in high-velocity cyberspace, data centers, and energy supply to support blockchain structures.

Big Data analytics in Fintech

- Big data is transforming the global financial technology industry and its role in Bangladesh is gaining increasing prominence. With the rapid development of computerized fund management, mobile money storage and payment platforms such as bKash and Nagad, Bangladeshi Fintech are well poised to leverage big data to improve decision-making, improve customer engagement and advance financial considerations.

Key Roles of Big Data in FinTech in Bangladesh

- ♦ **Enhancing Financial Inclusion:** Maximum of the unbanked people in Bangladesh (around 47% in 2021) live in rural areas. Evaluate mobile phone usage, deal patterns, and demographic data to classify the unbanked and underserved. Progress modified financial products such as microloans and savings accounts for rural ranges. Influence of big data to enlarge reach by mixing FinTech platforms and mobile financial service area.
- ♦ **Fraud Detection and Risk Management:** Financial frauds and cybersecurity intimidations are on the growth in Bangladesh's digital finance segment. Monitor real-time dealings to distinguish unusual patterns and glitches that indicate fraudulent happenings. Uses of analytical analytics to evaluate loan credit risk and avert defaults. Progress 'Anti-Money Laundering' and 'Know Your Customer' processes through big data analytics.
- ♦ **Improved Customer Experience:** Customers want personalized, fast, and reliable financial services. Analyze customer preferences, spending habits, and feedback to personalize financial products and services. Improve customer support through AI-powered chatbots and predictive customer service. Leverage sentiment analysis to track complaints and resolve issues faster.
- ♦ **Credit Scoring and Loan Disbursement:** Lacking a formal credit history, many small businesses and individuals are unable to obtain loans. Alternative credit scoring models use data from utility payments, mobile transactions and social media behavior. Faster and more accurate risk assessment for loan approval.
- ♦ **Optimizing Payment Systems:** Ensure efficient, secure and cost-effective digital payment systems. Analyze transaction data to reduce payment processing times. Manage system utilization by predicting peak transaction times.
- ♦ **Regulatory Compliance:** Stricter financial principles and rising FinTech activity demand better compliance measures. Automate governing reporting processes through data analytics. Ensure compliance with privacy and security regulations by tracking financial actions.
- ♦ **Market Insights and Product Innovation:** Understand market requirements and remain viable in a rapidly evolving sector. Analyze industry trends and customer preferences to develop innovative financial products. Identify market gaps such as: B. Demand for Islamic banking and microinsurance.

Challenges in Implementing Big Data in Bangladesh's FinTech Sector

- ♦ **Data Protection and Security:** Inadequate data protection regulations can impact the reliability of big data applications. Bangladesh needs stricter laws like GDPR to ensure data protection.
- ♦ **Lack of skilled labor:** Lack of data scientists and big data experts in the country limits the application of the technology.
- ♦ **Limited infrastructure:** Limited internet penetration and unreliable digital infrastructure, especially in rural areas, pose challenges.

Data Silos: Fragmented data from several financial institutions and service area can prevent actual study.

- ♦ **High cost of adoption:** Purchasing and maintaining big data tools and technologies can be affluent for startups and small FinTech establishments.
- ♦ **Integration with AI and blockchain:** Combining big data with AI and blockchain can further improve fraud detection, credit scoring, and purchaser personalization.
- ♦ **Government Support:** Initiatives such as Digital Bangladesh and data protection regulatory frameworks can boost big data adoption.
- ♦ **Collaboration among stakeholders:** Partnerships between banks, FinTech companies, and mobile operators can create a shared data ecosystem for better analytics.

Fintech is in Banking Operations in Bangladesh

Key Roles of FinTech in Banking Operations

- ♦ **Digital Payments and Transactions:** Fintech-based digital payment structures are transforming the way banking services are delivered in Bangladesh. Mobile Financial Services (MFS) such as bKash, Nagad, and Rocket have revolutionized payment substructures, making it faster and more accessible. Seamless remittances across mobile and online platforms.

Reducing cash dependency and furthering the government's vision of a cashless society. Increasing accessibility for underserved rural populations.

- ♦ **Financial Inclusion:** Fintech bridges the gap between traditional banks and the unbanked in rural Bangladesh. Microfinance and microloans are increasingly being offered through Fintech platforms that analyze customer data to determine creditworthiness. Fintech-based mobile banking services have brought millions of people into the financial ecosystem.
- ♦ **Banking Process Automation:** FinTech solutions automate repetitive and time-consuming banking processes, leading to significant efficiency gains. Automated loan approval process using algorithms and AI-based credit scores. Handling transactions and account reconciliations in real time. Automating customer service through AI-powered chatbots and IVR systems.
- ♦ **Fraud Detection and Risk Management:** FinTech enhance fraud prevention by leveraging big data and AI to monitor and detect suspicious activities in real time. Primary recognition of fraudulent contacts concluded pattern acknowledgement. Improved risk assessment of loans and investments through predictive analytics.
- ♦ **Improved customer experience:** FinTech enables banks to offer more personalized and user-friendly services, thereby increasing customer satisfaction and loyalty. AI-powered personalization of financial products based on customer preferences. Omnichannel banking experience across apps, websites and MFS platforms. Automated query resolution reduces wait times.
- ♦ **Credit and Loan Solutions:** Traditional banking processes for credit and loans are enhanced with FinTech solutions that enable faster data-driven decisions. Credit scoring based on alternative data sources like utility bills, mobile payments, transaction history etc. AI and machine learning algorithms for faster loan approvals. Small businesses and individuals without a formal credit history can also access credit.

Blockchain in Banking: Though blockchain is still in its early stages, it has the potential to transform banking in Bangladesh through increased transparency, security and efficiency. Secure and tamper-proof financial transactions. Simplify trade finance and cross-border payments. Real-time payments reduce dependency on intermediaries.

- ♦ **Challenges of FinTech Adoption in Banking in Bangladesh**
- ♦ **Regulatory Uncertainty:** Regulatory ambiguity surrounding new FinTech innovations such as blockchain and cryptocurrencies. Stringent Bangladesh Bank guidelines for the activities of non-banking financial institutions.
- ♦ **Cybersecurity Threats:** Increasing reliance on digital platforms has made banks vulnerable to cyber-attacks. Many financial institutions lack robust cybersecurity infrastructure.
- ♦ **Digital Divide:** Limited digital literacy and internet penetration hinders the adoption of digital banking services, especially in rural areas.
- ♦ **High implementation costs:** Small banks and financial institutions struggle to afford advanced FinTech solutions.
- ♦ **Lack of skilled workforce:** There is a lack of expertise in areas such as AI, big data and blockchain technology.
- ♦ **Future outlook for FinTech in Bangladesh banking**
- ♦ **Banks' collaboration with FinTech startups:** Banks can collaborate with FinTech startups to leverage innovative solutions for lending, payment systems and customer services.
- ♦ **AI-powered banking:** AI can be further leveraged to automate decision making, improve fraud detection and provide personalized services.
- ♦ **Blockchain integration:** Blockchain can improve transparency in cross-border payments, trade finance and data security.
- ♦ **Government support and policy development:** Clear regulations and incentives for the adoption of FinTech solutions can accelerate the digital transformation of the banking industry.

How fintech can help women in Developing economies: Bangladesh

Fintech can play a transformative role in empowering women in evolving countries like Bangladesh. Fintech leverages digital tools and advanced financial services to remove barriers to financial inclusion, encourage entrepreneurship and advance gender equality. Fintech can economically and socially empower women by eliminating institutional barriers, promoting entrepreneurship and giving women entree to financial tools.

- ♦ **Growing Access to Financial Service area** (Bangladesh Bank, 2023; World Bank, 2022)

- **Challenge:** Many women in emerging countries cannot access traditional banking facilities due to mobility restrictions, cultural restrictions, and lack of documents.
- **Solution:** Fintech platforms, particularly mobile banking and digital wallets, give women easy and reasonable access to financial facilities.
- **Illustration:** bKash, a mobile money stage in Bangladesh, allows women to save, send, and spend straight from their phones without demanding a traditional bank account.
- **Impact:** Studies show that mobile money gives women more control over their household finances and increases their participation in the economy.

Empowering Female Entrepreneurs

- **Challenge:** Women in small businesses face complications in retrieving credit and loans due to gender biases and lack of security.
- **Solution:** Fintech companies offer microloans, peer-to-peer lending, and digital credit stands based on the substitute data like mobile usage, social media activity, and operation history.
- **Illustration:** Grameenphone in Bangladesh offers digital credit facilities tailored for women entrepreneurs, allowing them to expand their trades.
- **Impact:** A study by the International Finance Corporation (IFC) shows that women who accessed digital credit were more likely to put into in their trades and improve their livelihoods.

Encouraging Digital Learning and Financial Education

- **Challenge:** Many women lack the obligatory digital and financial literacy to use fintech tools successfully.
- **Solution:** Fintech platforms often incorporate enlightening modules or collaborate with NGOs to teach women how to use digital financial facilities safely.
- **Illustration:** BRAC, a major NGO in Bangladesh, partners with fintech stages to train rural women in digital literacy and financial organization.
- **Impact:** Enlarged digital literacy enables women to take benefit of fintech tools, enhancing their financial self-sufficiency.

Simplifying Remittances and Societal Safety Nets (Global Database, 2021)

- **Challenge:** Women in emerging economies often rely on remittances or government transfers, which can be exclusive or hard to access.
- **Solution:** Fintech platforms streamline domestic and international remittances, reducing costs and improving reliability.
- **Illustration:** Nagad, a digital financial service in Bangladesh, has united with the government to pay out social safety net payments straight to women's mobile wallets.
- **Impact:** Direct digital transfers reduce dependency on mediators and ensure women receive their full privileges.

Addressing Gender Gaps through Targeted Service area (Global Database, 2021)

- **Challenge:** Many financial products are not planned with women's needs in mind.
- **Solution:** Fintech companies can progress women-centric financial services, such as savings accounts personalized for education, healthcare, or child-rearing expenditures.
- **Illustration:** Dhaka Bank's partnership with fintech platforms consist of products considered specifically for women, such as low-interest loans and savings structures.
- **Impact:** Custom-tailored financial solutions increase women's participation in the formal economy and address their unique challenges.

The Impact of Cultural Barriers on Fintech: Bangladesh

Cultural barriers play a key role in the limited adoption and effectiveness of fintech solutions in Bangladesh, especially for marginalized groups such as women. These barriers are deeply rooted in social norms, traditions and gender dynamics, often limiting access to and use of digital financial services.

- **Gender Norms and Constraints (GSMA, 2022).**

- **Challenge:** In Bangladesh, traditional gender norms often restrict women to roles within the household, limiting their economic independence and access to fintech services.
- **Illustration:** Many women need permission from male family members to open accounts, use mobile phones and access financial products.
- **Impact:**
 - Women have lower financial literacy than men and find it harder to understand and trust digital financial services.
 - Low mobile phone possession among women (25% less than men according to GSMA) limits their ability to use mobile finance and fintech stages.

Trust issues with digital platforms (World Bank, 2022)

- **Challenge:** A culture that favors face-to-face interactions makes many people skeptical of fintech platforms, especially in rural areas
- **Illustration:** Many people prefer cash transactions over digital payments as they do not trust online systems.
- **Impact:**
 - Fear of fraud and a lack of understanding of digital security discourage people from using fintech.
 - Women, in particular, often have less trust in digital platforms due to their less exposure to technology.
- **Digital Literacy Gap**
- **Challenge:** Cultural attitudes often result in a lower priority being given to women's education, leading to a gender gap in digital literacy.
- **Illustration:** Families are less likely to invest in girls' education, which may limit their ability to effectively use fintech services.
- **Impact:**
 - Rural women are less likely to know how to use smartphones, apps, and mobile money platforms.
 - Lack of customized economic education further widens this gap.

Stigma About Female Financial Individuality (IFC, 2021)

- **Challenge:** Cultural arrogances often stigmatize women's financial independence, depressing them from managing their own money or inaugural accounts.
- **Illustration:** Women who use fintech tools without male accord may face reproach or distrust from their families and societies.
- **Impact:**
 - Women are less likely to adopt fintech facilities, even when they are accessible.
 - Financial products may be promoted primarily to men, strengthening elimination.

Religious and Cultural Understandings (Islamic Development Bank, 2021)

- **Challenge:** In the mostly Muslim country like Bangladesh, fintech resolutions must align with Islamic principles, such as circumventing interest-based economic products.
- **Illustration:** Some personalities avoid using digital economic services because they distinguish them as dissenting with Islamic banking performs.
- **Impact:**
 - Fintech companies that fail to offer Shariah-compliant services may alienate a substantial percentage of the population.
 - Women, in particular, may exhortation from using such services due to spiritual guidance from family or communal leaders.

Family-Controlled Supervisory (ICRW, 2022)

- **Challenge:** In many Bangladeshi family circle, financial decisions are measured by male members, leaving women with restricted autonomy.

- **Illustration:** Women may not have switch over their earnings or the ability to individualistically use fintech daises.
- **Impact:**
 - Unfluctuating when women have contact to mobile money, male family members may dictate its use.
 - This limits women's ability to save, invest, or grow their businesses using fintech tools.

Addressing the Enlightening Barriers

To overcome these barriers, fintech companies and representatives in Bangladesh must:

- **Encourage Digital and Financial Literacy:** Programs directing women and marginalized communities can help bridge the information gap.
- **Build Belief:** Offering secure, transparent, and user-friendly platforms while addressing apprehensions about deception.
- **Develop Women-Centric Products:** Tailoring fintech explanations to meet women's unique needs and contribution Shariah-compliant options.
- **Engage Communal Leaders:** Involving religious and cultural leaders in advocacy campaigns can help change insights.
- **Inspire Mobile Ownership for Women:** Subsidizing smartphones for women can increase their access to digital stands.

Application of Fintech in Urban vs Rural: Bangladesh

The application of fintech in urban and rural areas displays significant disproportion due to variances in access to technology, digital literacy, infrastructure, and socio-economic circumstances.

Adoption Rate of Fintech in Urban vs. Rural Areas

- **Urban Areas:**
 - Higher implementation of fintech because of higher net saturation, big cellphone usage, and more consciousness.
 - Urban residents are much more likely to apply fintech assemblies like bKash, Nagad, and Rocket for invoice bills, e-trade transactions, and wages payouts.
- **Rural Areas:**
 - Adoption is evolving however lags at the back of city areas because of limited get right of entry to smartphones, weaker communal coverage, and reduction virtual literacy.
- Rural customers explicitly use fintech for fundamental offerings like cash handovers and being paid remittances.
- ♦ **Ratio:** While the specific numbers fluctuate, reviews recommend fintech dispersion in city regions is about 60-70%, as compared to 30-40% in rural areas Cases in Urban and Rural Areas. Using determinations are:
 - **Urban Areas:**
 - Online purchasing and virtual bills thru assemblies like bKash and Upay.
 - Personal loans and credit score contributions thru apps like Shadhin Fintech.
 - Investments in virtual economic savings and assurance.
 - **Illustration:** Dhaka, Chattogram, and vital towns justification for a majority of bKash's energetic customers.
 - **Rural areas:**
 - In receipt of home and global remittances.
 - Accessing authorities' appropriations.
 - Peer-to-peer cash handovers.
 - **Illustration:** Nagad is used to disburse social protection internet bills in rural regions, such as stipends for farmers and girls.

Economic Literacy Gap

- **Urban Areas:**
 - Urban populations are much more likely to be financially literate, letting them undertake complicated fintech offerings like virtual credit score, microloans, or funding structures.

• **Rural Areas:**

- Financial literacy stays low, in particular amongst girls and marginalized groups, proscribing the cap potential to apprehend and use fintech offerings effectively.
- **Illustration:** A survey via way of means of BRAC determined that rural customers frequently depend on casual networks for economic recommendation and are much less assured the use of virtual economic tools.

Commendations for Associating the Gap

- Expand Network Infrastructure net and cell insurance in rural regions to facilitate fintech growth.
- **Enhance Financial Literacy:** Focus on virtual and economic literacy applications focused on rural populations, in particular girls.
- **Subsidize Smartphones:** Provide less expensive smartphones to rural groups to boom get right of entry to.
- **Leverage Government Platforms:** Use structures like Nagad for broader disbursement of subsidies and social protection internet bills.

VI. Findings, Results and Discussions

Findings

Fintech has arisen as an influential tool for promoting financial inclusion, mostly in emerging economies like Bangladesh, where a substantial portion of the residents remains unbanked or underbanked. Many factors impact the role of Fintech in nurturing financial enclosure in this framework.

- ◆ Approachability and Penetration of Digital Expertise
 - Mobile Phone Usage
 - Cyberspace Access
- ◆ Governing and Strategical Formations
 - Supportive Principles
 - Barriers
- ◆ Responsiveness and Financial Knowledge
 - Low Financial Knowledge
 - Government and NGO's Approach
- ◆ Charge and Affordability
 - Transaction Charges
 - Hidden Charges
- ◆ Faith and Safekeeping Concerns
 - Perceived Safekeeping Risks
 - Reputation of Benefactors
- ◆ Financial Ecology Combination
 - Microfinance Association
 - Small Trades Funding
- ◆ Socio-Cultural Barriers
 - Gender Discrimination
 - Linguistic Barriers
- ◆ Mobile Financial Services (MFS)
 - Blockchain and Artificial Intelligence
 - Numeral Expenses
- ◆ Impact of COVID-19

- Contactless expenses
- Digital transfers, and e-commerce

In Bangladesh, fintech has proven to be a catalyst in overcoming traditional hurdles such as physical access, cost and complexity in financial services and increasing presence in the financial sector. Nevertheless, challenges such as lack of computing literacy, regulatory restrictions and socio-cultural barriers need to be addressed to fully harness the potential of fintech in achieving full integration in the financial sector.

Results

An assessment of factors influencing the role of fintech in promoting financial inclusion in Bangladesh reveals both positive impacts and ongoing challenges. The findings show how fintech is reshaping financial access and inclusion while addressing key barriers in emerging economies.

- ◆ **Heightened Access to Financial Service area** (Karim and Akter, 2020)
 - Enlarged Financial Enclosure
 - Development of Mobile Connections
 - Influence to SME Progress
- ◆ **Linking the Urban-Rural Split** (Khan and Yasmin, 2020)
 - Rural Infiltration
 - Agent Systems
- ◆ **Concentrated Transaction Charges and Period** (Khan and Yasmin, 2020)
 - Cost-Effectiveness
 - Opportuneness
- ◆ **Authorization of Underserved Clusters** (Hossain and Akhter, 2021)
 - Increased Females Involvement
 - Economic Freedom
- ◆ **Development of Numerical Literacy and Consciousness** (Begum et al.,2021)
 - Augmented Adoption
 - Modification in Mindset
- ◆ **Challenges Persevere** (Kabir et al.,2020)
 - Low Numerary Literacy
 - Gender Gap
 - Connectivity Matters
 - Fraud and Safekeeping Apprehensions
- ◆ **Involvement to the Nationwide Economy** (Islam and Sarker, 2022)
 - Enhancement to GDP
 - Commercial Flexibility
- ◆ **Numerical Highpoints** (Hossain and Akhter,2021)
 - Mobile Financial Service Handlers
 - Digital money flow
 - SME Credit Contact
- ◆ **Significant Takeaways** (Rahman et al.,2020)
 - Fintech stands on a Game-Changer
 - Encounters Remain

- Combined Efforts are Required
- ◆ **Data stipulations for Factors influencing the role of Fintech:** This background outlines the key variables, data sources, and systematic approaches to evaluate the relationship between fintech and financial inclusion.
- **Pointers of financial inclusion:**
 - Percentage of the population with access to formal financial facilities (bank accounts, mobile wallets).
 - Regularity of digital financial communications.
 - Access to credit through digital stages.
 - Investments in digital accounts.
 - Gender gap in financial service practice.
- **Factors Inducing Fintech Implementation**
 - Socio-Economic Physical appearance
 - Digital and Financial Literacy
 - Enlightening and Social Barriers
 - Government and Regulatory Setting
 - Fintech Ecology
 - Substructure
 - Economic Pointers

Discussions

- ◆ The role of fintech in promoting financial inclusion in Bangladesh is promising. While significant progress has been made in reaching the unbanked population, efforts must be made in addressing systemic challenges to achieve complete financial inclusion and economic empowerment.
- ◆ **Availability and Technology Entrance** (Hossain and Akhter, 2021)
 - Versatile Penetration
 - Digital Financial Service area
 - Web Connectivity
 - Device Openness
- ◆ **Directing and Strategy Standpoint** (Kabir et al.,2020)
 - Loyal Rules
 - Financial Insertion Strategies
 - Governing Barriers
 - Strategy Execution
- ◆ **Financial Proficiency and Consciousness** (Islam and Sarker, 2022)
 - Education Inventiveness
 - Awareness Operations
 - Low Proficiency Levels
 - Social Resistance
- ◆ **Charge and Affordability** (Islam and Sarker,2022)
 - Reduced Charges
 - Reasonable Transactions and Unseen Fees
 - Affordability of Strategies
- ◆ **Faith and Safekeeping** (Hossain and Akhter,2021)

- Structure of Belief and Safety Dealings
- Cybersecurity Hazards
- Fraudulent Happenings
- ◆ **Financial Ecology Combination** (Begum et al.,2021)
- Alliance with MFIs
- Supportive SMEs
- Disjointed Ecology
- ◆ **Socio-Cultural Features** (Khan and Yasmin,2020)
- Gender Enclosure
- Enlightening Adaptation
- Gender Discrimination and Linguistic Barriers
- ◆ **Influence of COVID-19** (Islam and Sarker,2022)
- Augmented Adoption
- Government Aid Dissemination
- Computerized Digital infrastructure
- ◆ **How fintech can help women**

The debate on fintech and financial inclusion in Bangladesh highlights the transformative potential of fintech in bridging the financial divide. While significant progress has been made, further efforts are needed to address challenges related to education, administrative boundaries, and socio-cultural norms. By leveraging innovation and developing strong bio-systems, fintech can make a significant contribution to achieving financial mainstreaming in Bangladesh.

VII. Conclusion

The role of fintech in promoting financial concepts in a country like Bangladesh is crucial. It is driven by financial institutions to modernize finance and promote global development. Fintech options are on the rise in Bangladesh due to the growth of the digital ecosystem and the penetration of mobile phones. Mobile money and digital wallets such as bKash, Nagad and Rocket have eased access to financial institutions, especially in densely populated and underserved areas, and reduced the barrier of entry for the unbanked. The Bangladesh government and institutions such as Bangladesh Bank have played a key role in formulating strategies to foster the fintech movement while ensuring consumer safety. Programs like the National Budgetary Thought Methodology aim to bridge the gap in financial access by creating an enabling environment for fintech development. A central challenge in monetary theory is increasing financial capacity, especially at the country level. As access to financial services reaches a basic level, fintech is poised to reach those who are marginalized today and provide everything from microloans to securities. Fintech platforms can offer financial services at cheaper rates than traditional money storage systems due to their low operational costs. This may be particularly relevant for Bangladesh, where low-cost financial services are essential for low-income groups to access the formal economy. Collaboration between fintech companies and traditional banks has enabled easier money integration. Challenges for Fintech development in Bangladesh are concerns regarding cybersecurity and adoption at the development stage. Ensuring data security through the complexities of management systems and networks and generating customer acceptance are fundamental to support the positive impact of Fintech on financial inclusion. In any case, overcoming challenges regarding security, transparency and adoption is crucial for Fintech to realize its full potential, reach all segments of society and drive sustainable economic development in the country.

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