International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Leveraging Mobile Technology for Financial Empowerment: The Impact of Nano Loans in Bangladesh

Mr. Muin Uddin Ahmed[1], Mr. Sumon Miah[2], Mr Sohana Nizam[3], Mr. Abdullah Al Mamun[4], Mrs Trisha Ahmed[5]

[1]Senior Lecturer, Accounting and Finance, North South University
[2]Assistant Manager, Marketing and Business Development, Super Star Group
[3]Student, Accounting and Finance, North South University
[4,5]Lecturer, Accounting and Finance, North South University

Abstract

Limited access to financial resources presents a major obstacle to poverty alleviation and economic growth in Bangladesh, a common issue among emerging economies. While conventional microfinance has demonstrably expanded financial inclusion, considerable disparities persist, particularly among those marginalized from mainstream financial services. This study assesses the feasibility and potential effects of mobile-based micro-loans in Bangladesh as a potential solution to address these shortcomings. Mobile technology facilitates the provision of small, accessible nano loans to low-income individuals for emergency and short-term needs, thus enhancing their financial resilience and autonomy. This research utilizes a mixed-methods methodology, incorporating qualitative stakeholder interviews and quantitative user survey data, to ascertain both the potential and the challenges inherent in nano-loan implementation. Research reveals significant consumer demand for mobile financial services, yet also identifies obstacles concerning digital literacy, regulatory frameworks, and societal attitudes. This document presents actionable recommendations for the pilot and scaling of nano-loan initiatives, underscoring the significance of collaborative efforts across sectors and customized educational programs to achieve broad adoption. Nano-loans are ultimately poised to make a significant contribution to the formalization of financial inclusion for Bangladesh's unbanked population.

Introduction

Financial constraints are widely acknowledged as significant macroeconomic barriers that impede development in low and lower-middle-income countries (Beck, Demirgüç-Kunt, & Maksimovic, 2005; Giuliano & Ruiz-Arranz, 2009). In response, policymakers have increasingly focused on the development of financial markets and institutions as a means of stimulating socioeconomic progress. Consequently, many developing economies have pursued financial liberalization and diversified loan mechanisms. However, such strategies often fail to ensure uniform progress due to country-specific demographic disparities and

limitations. For instance, while microfinance has demonstrated its capacity to alleviate poverty in numerous developing nations (Obaidullah, 2008; Baumann, 2001; Quinones &Remenyi, 2014), it has not effectively addressed extreme poverty, as the most destitute often remain ineligible for microloans offered by traditional non-governmental organizations (NGOs) and microfinance institutions (Pitamber, 2003; Haque &Yamao, 2008).

There is a pressing need to explore alternative small-scale financing options that can complement existing microfinance channels and effectively reach those who are excluded from conventional microcredit programs. This need is particularly acute in developing economies characterized by high levels of informal labor participation and significant rural populations. This paper examines the potential for modernizing traditional microcredit systems in Bangladesh, a lower-middle- income South Asian nation that exemplifies these challenges. Bangladesh has witnessed substantial rural-to-urban migration, particularly to the capital city of Dhaka, as individuals seek better employment opportunities. However, the formal sector in Dhaka remains difficult to penetrate, forcing many migrants into a burgeoning informal economy. According to the Asian Development Bank, approximately 18.7% of Bangladeshis live below the poverty line, illustrating the country's profound poverty challenges (ADB, 2022). Additionally, nearly 60 percent of the population resides in rural areas, primarily engaged in agriculture (World Bank, 2023). However, many of these individuals lack formal education and access to bank accounts, disqualifying them from accessing traditional microcredit (Haque &Yamao, 2008).

Asymmetric information and complex banking systems further restrict access to loans for poor households, particularly in rural areas, leading many to rely on exploitative lenders who charge exorbitant interest rates. Although microcredit programs have significantly contributed to Bangladesh's economic development, their benefits have primarily accrued to the moderately poor, rather than the extreme poor (Westover, 2008). In 2011, Bangladesh Bank introduced mobile financial services to integrate unbanked populations, both rural and urban, into the formal financial system. Services like Bkash and Rocket are widely used for money transfers, with Bkash also offering savings and payment options. However, these initiatives have not sufficiently reached large segments of the population, resulting in continued reliance on informal monetary channels.

This paper aims to conduct a feasibility analysis of Nano loans in Bangladesh, a concept designed to complement existing microfinance strategies. Unlike traditional microloans, Nano loans are smaller and can be processed via mobile phones, reducing bureaucratic barriers and making them more accessible to individuals with limited education. Furthermore, unlike microfinance, which can create group peer pressure, Nano loans offer privacy and security, as borrowers manage their loans independently. In countries like Kenya, India, and Ghana, Nano loans have garnered positive responses. This model typically involves collaboration between commercial banks and mobile operators, as exemplified by India’s TALA app. Given that about 64% of Bangladesh’s population is under 35 years old and mobile phone subscriptions reached 190.36 million in 2023—continuing to rise according to BTRC reports—there is significant potential for Nano loans. Despite the absence of extensive studies on this topic, this research seeks to address the knowledge gap and assess the feasibility of Nano loans as a means of integrating informal, unbanked populations into the formal financial system.

Literature Review

In Bangladesh, non-governmental development organizations (NGDOs) have predominantly targeted individuals who are relatively more solvent, often neglecting the extremely poor and thereby limiting the overall reach of microcredit programs (Datta, 2004). The advent of mobile financial services (MFS) offers a more inclusive solution to the unbanked population by providing financial accessibility anytime and anywhere, thus addressing the barriers prevalent in traditional banking systems. MFS can deliver low-cost services to a broader customer base by leveraging the widespread use of personal mobile devices (World Bank, 2009).

Microfinance has long been recognized for its potential in poverty alleviation, especially in developing countries. Its roots in Bangladesh trace back to informal practices of providing small, collateral-free loans. Early examples include philanthropic loans by Rabindranath Tagore to poor farmers and the Comilla Model initiated by Akhtar Hameed Khan in the 1960s (Nath, 2004; Seibel, 2005). The structured microfinance model was pioneered by Muhammad Yunus through the Grameen Bank in the late 1970s, primarily targeting women with collateral-free loans (Yunus&Jolis, 1998). This model has since been replicated globally, inspiring numerous innovations in the microfinance sector.

Over the past few decades, the microfinance sector in Bangladesh has undergone significant evolution. The success of Grameen Bank catalyzed the proliferation of other microfinance institutions (MFIs) such as BRAC and ASA, which have adapted the Grameen model in various ways. Microfinance has been lauded for its role in generating self-employment, reducing poverty, empowering women, and enhancing social cohesion (Khandker, 1998; Pitt &Khandker, 1998; Simanowitz, 2003). However, it has also faced substantial criticism. Some scholars argue that microfinance can lead to over-indebtedness, fail to reach the poorest segments effectively, and in some cases, exacerbate poverty (Armendariz de Aghion & Morduch, 2005; Bateman, 2010). Critics highlight that high-interest rates and the pressure to repay loans can create a cycle of debt rather than alleviating poverty (Karim, 2008).

The financial sustainability of MFIs in Bangladesh remains a contentious issue, with challenges including institutional capacity, the diversity of financial services, and the impact of political and macroeconomic factors. Furthermore, the sector grapples with issues related to regulatory frameworks and competition among MFIs.

The integration of technology into microfinance represents a significant shift, particularly with the introduction of cellphone-based Nano loans. These loans, typically small and short-term, are disbursed and repaid via mobile phones, leveraging the widespread use of mobile technology in Bangladesh, even among the rural poor (Rahman, 2019). Numerous studies have underscored the potential benefits of mobile banking and Nano loans, noting that mobile technology can reduce transaction costs, increase transparency, and improve the efficiency of loan disbursement and repayment processes (Donovan, 2012). Furthermore, cellphone-based services have the potential to extend the reach of financial institutions into remote areas, thereby incorporating more individuals into the formal financial system (Jack & Suri, 2011).

Despite the potential benefits, challenges associated with cellphone-based Nano loans persist. Ensuring digital literacy among users, maintaining data privacy, and preventing fraud are critical concerns that must be addressed. Additionally, the regulatory framework needs to evolve to accommodate these new financial services while ensuring consumer protection (CGAP, 2015). In Bangladesh, the successful implementation

of cellphone-based Nano loans will depend on collaboration among financial institutions, telecom operators, and regulatory bodies. Programs must be designed to be user-friendly and accessible to those with limited literacy and technical skills (Islam, 2018).

Mobile banking has significantly reduced transaction costs, facilitating the transfer of funds without the need for physical cash handling. This accessibility is crucial for integrating more users into the formal financial system, making it a vital innovation for developing nations (Anaysi & Otubu, 2009). However, establishing bank branches in rural areas remains challenging due to high costs and regulatory constraints, with the Central Bank permitting a maximum of only 15 new branches per year (Kabir, Islam, &Inam, 2013).

Current microloan initiatives by NGOs often lack effective monitoring of loan utilization, leading to divergent management practices across organizations. Research indicates that women who obtain loans often transfer the funds to their husbands, who may not invest them productively. Moreover, NGOs face complaints from dropout members regarding stringent criteria and undisclosed high interest rates (Khatun et al., 2013).

The proliferation of mobile phone usage in Bangladesh has coincided with an increase in mobile application utilization. Most smartphone users in the country prefer Android devices due to their affordability, particularly among lower-income individuals. For instance, the 'Maya Apa' app, which addresses female health issues, demonstrates the demographic's strong reliance on smartphones, with 65.9% of users engaging with their devices for at least three hours daily. However, app developers must prioritize language accessibility, as many users are unwilling to pay for applications (Ahmed et al., 2015).

Numerous NGOs in Bangladesh, inspired by the success of Grameen Bank and the failures of formal financial institutions, have emerged to provide collateral-free loans. However, high operational costs and interest rates continue to impede access to formal financial services for poor populations. Mobile financial services offer a promising alternative for banking the unbanked. Currently, MFIs in Bangladesh primarily use information and communication technology (ICT) for managerial purposes rather than for mobile microfinance programs. Although organizations like BRAC and ASA provide MFS primarily for remittances, greater participation in mobile financial services from MFIs could be achieved through a more enabling regulatory environment (Sultana & Khan, 2016).

Bkash, a leading MFS provider, has transformed financial transactions for rural populations, serving as an effective tool for poverty alleviation. This service has lowered transaction costs, facilitated timely remittances for individuals in remote areas, and reduced corruption and fraud by intermediaries, significantly improving the standard of living for many rural residents (Hossain & Russel, 2017).

The feasibility of Nano loans in Bangladesh lies in their potential to provide accessible, efficient, and transparent financial services to underserved populations. While they offer significant advantages over traditional microfinance models, addressing the associated challenges will be crucial for their success. Continued research and pilot programs will be essential to refine these services and maximize their impact on poverty alleviation.

Research Method

- **Methodology**

This study employs a mixed-methods approach to assess the feasibility and challenges of cellphone-based nano loans in Bangladesh, combining qualitative and quantitative research methods. This approach provides

a comprehensive view, capturing insights from both supply- and demand-side perspectives in the financial ecosystem (Creswell & Plano Clark, 2011).

1. Supply-Side Analysis: Key Informant Interviews (KII)

For the supply-side analysis, **Key Informant Interviews (KII)** were conducted with senior representatives from microfinance institutions, the Bangladesh Bank, and mobile financial service providers. Participants included senior officers from Grameen Bank, BRAC, and mobile operators like Grameenphone, Banglalink, and Bkash. These interviews provided insights into operational challenges, technological requirements, and regulatory issues related to nano loan implementation. Such qualitative data is essential for understanding the intricate logistical and strategic factors affecting nano loans, particularly the need for institutional collaboration and regulatory compliance (Patton, 2015).

2. Demand-Side Analysis: Quantitative Survey

On the demand side, a **quantitative survey** was conducted with a sample of 100 respondents from lower-income groups. The survey included questions covering respondents' financial situations, borrowing practices, perceptions of banks, NGOs, microfinance institutions (MFIs), and mobile financial services. Key areas of inquiry were monthly income, previous borrowing experience, and familiarity with mobile financial services, which are crucial factors influencing the feasibility of nano loans in this demographic.

The sample was selected using **a non-probability sampling method**, which includes convenience and snowball sampling. This approach was chosen due to accessibility and practicality constraints within the target population. However, non-probability sampling presents limitations to generalizability, as it risks selection bias by possibly overrepresenting individuals who are easier to reach or more open to participating. Such sampling limitations have been acknowledged in social science research as common in exploratory studies (Babbie, 2017), but they restrict the broader applicability of the findings.

3. Limitations of the Sample and Methodology

The non-probability sampling method used in this study limits the extent to which the results can be generalized to the larger lower-income population in Bangladesh. Since participants were not selected randomly, there is potential for selection bias, which may skew findings toward individuals with certain characteristics or more favorable perceptions of mobile finance. Additionally, the relatively small sample size of 100 respondents, while appropriate for an initial exploratory study, further constrains the generalizability of the findings and may limit insights into specific demographic or regional variations (Henry, 1990).

Future research could address these limitations by employing stratified random sampling across various socio-economic and geographic segments within Bangladesh, enhancing the representativeness of the results. Such an approach could improve the robustness of findings and provide a more comprehensive basis for policy development related to nano loans.

4. Data Collection and Analysis

Surveys were conducted in person, which helped to maximize response accuracy, particularly given the varied literacy levels within the sample. This approach aligns with best practices for surveying low-literacy populations, where face-to-face engagement can help clarify questions and reduce response error (Groves et al., 2009). The qualitative data from KIIs was analyzed through thematic content analysis to identify major themes related to regulatory, operational, and social challenges, while quantitative survey data was statistically summarized to highlight trends in respondents' borrowing needs and attitudes toward nano loans.

While the non-probability sampling limits generalizability, the mixed-methods approach provides valuable preliminary insights into nano loan feasibility in Bangladesh. Future studies should aim to use randomized, larger samples to substantiate findings, thereby reinforcing the applicability of policy recommendations and supporting broader financial inclusion initiatives.

Demographic Data

There were a total of 100 respondents and the summary of the survey data is reported in Table 1. It contains respondents' gender, occupation, education, number of family members, mobile phone usage, and number of Bkash account holder, income and expenditure level.

Table 1: It shows the demographic characteristics of respondents

GenderMonthlyIncome(taka)

Female26%Below500013% Male74%6000-10,00028%
Age11,000-15,00021% Below161%Above15,00038%
25-3536%Around5,00011% **MonthlyExpenditure(taka)**
36-5022%Around10,00017%
51andabove12%Above10,00072%
EducationNumberofpeoplewhohaveacellphone
Basiceducation33%Yes95% PrimarySchool18%No5%
SSC11%**Peoplewhousemobileonlytomakephonecall**61%
HSC 34%
12%**Peoplewhousemobileforman ypurposes(internet, app)**
Noeducation26%**Peoples'mobilerechargeamount**
Occupation100-30030% Rickshaw-puller9%400-60041% Hawker31%700- 100021%
HouseholdHelp7%Above3% Lowerlevelgarmentsworker10%**Bkashaccountholders**

Farmer3%Yes47% Others35%No53% **MaritalStatus**
Married70%
Unmarried/Widow/Divorced
30% **FamilyMembers**
2-4people58% 4-6people33%
7ormore10% Alone2%
Familywithkids56%
Familywithoutkids44%
Amongthose56familieswith kids
Kidsgotoschool50%
Kidsdonotgotoschool6%
Familieswhohav eold members
Yes52%
No48%

Thematic content analysis

The analysis of the collected data has revealed several key themes that are crucial for the successful

implementation of a Nano loan system in Bangladesh. These themes highlight the primary challenges and potential opportunities associated with this financial innovation.

Regulatory and Bureaucratic Challenges

One of the most significant challenges identified is the necessity for the implementing organization to obtain governmental approval before introducing a new financial product to the market. This regulatory requirement can cause delays and create uncertainty, potentially hindering the operational readiness and overall effectiveness of the Nano loan initiative. The need for compliance with existing regulatory frameworks, including those governed by the Microcredit Regulatory Authority (MRA) and the Bangladesh Telecommunication Regulatory Commission (BTRC), adds additional complexity to the implementation process. Although these regulations are essential for consumer protection, they may also pose substantial barriers to the swift deployment of Nano loans.

Potential Social Benefits and Financial Inclusion

Despite these challenges, stakeholders generally acknowledge the significant social benefits that Nano loans could provide, particularly in terms of integrating informal, unbanked populations into the formal financial system. The introduction of Nano loans is seen as a promising initiative that could enhance financial inclusion by offering accessible credit to marginalized groups. However, the success of the Nano loan system will depend on overcoming several obstacles, including those related to technological infrastructure, regulatory compliance, and the varying levels of financial literacy among potential users.

Addressing the Shortcomings of Traditional Microloan Programs

Nano loans present an opportunity to address some of the limitations associated with traditional microloan programs. While microfinance has played a crucial role in poverty alleviation, it has also faced challenges, particularly regarding accessibility and borrower eligibility. By leveraging mobile technology and reducing bureaucratic hurdles, Nano loans offer a more flexible and user-friendly alternative that could better meet the needs of lower-income individuals who have historically been underserved by conventional financial institutions. Additionally, the independent management of Nano loans by borrowers, free from the peer pressure often associated with microfinance group models, is a notable advantage.

Demand and Market Readiness

The demand for Nano loans is evident, yet several complications must be addressed to ensure successful implementation. Survey data indicate that 95% of respondents own mobile phones, suggesting widespread access to the necessary technology. However, effective engagement with NGOs and microfinance institutions will require basic financial and digital literacy among potential users. While the government's commitment to digitalization is encouraging, the need for formal approval processes for new loan systems and the prohibition on sharing customer data without consent present significant regulatory challenges.

Establishing a Nano loan initiative may not be financially viable for a single organization due to the small loan amounts involved, which could lead to significant capital costs. Moreover, if the market infrastructure is not adequately developed, issues may arise regarding customer readiness and acceptance. The transactional system must enable seamless loan disbursement and repayment via mobile devices to enhance user experience and minimize operational costs. If users are required to cash out their loans at customer service outlets, operational costs could increase, potentially deterring borrowers and pushing them toward informal lending sources.

Cultural and Social Considerations

Cultural factors also play a critical role in the acceptance of Nano loans. In Bangladesh, borrowing is sometimes perceived as socially unacceptable, particularly within the predominantly Muslim population, where it may be viewed as contrary to religious beliefs. Additionally, concerns about the impact of new loan systems on societal productivity may lead individuals to seek financial assistance from family members rather than formal sources. Despite these cultural reservations, a significant portion of loan recipients reported relying on loans to maintain their standard of living when their expenditures exceed their income.

5.1. Demand for Nano Loan exists but few complications need to overcome first

The demand for Nano loans in Bangladesh is evident, as indicated by the high levels of mobile phone ownership among the surveyed population—95% of respondents reported owning a mobile phone. This widespread access to mobile technology suggests a solid foundation for the adoption of Nano loans. However, several significant challenges must be addressed to ensure the successful implementation and sustainability of this financial innovation.

One of the primary complications lies in the requirement for users to possess not only a mobile phone and connection but also a basic understanding of how to engage with NGOs and microfinance institutions (MFIs). While mobile technology is widely available, the financial and digital literacy required to effectively use Nano loans remains a barrier for many potential users. The government's ongoing efforts to digitize the country provide a supportive environment for the adoption of technology-based financial solutions, yet the regulatory landscape poses additional challenges.

NGOs and MFIs in Bangladesh are regulated by the Microcredit Regulatory Authority (MRA), necessitating formal approval before introducing new loan systems. Additionally, mobile operators are governed by the Bangladesh Telecommunication Regulatory Commission (BTRC), which prohibits the sharing of customer data with third parties without explicit consent. These regulatory requirements, while essential for consumer protection, can create delays and complicate the process of launching a Nano loan system.

A collaborative framework between NGOs/MFIs and mobile operators, such as Bkash, could potentially alleviate some of these regulatory hurdles, as Bkash already has an extensive customer database. However, even with such collaboration, regulatory approval would still be required under existing Mobile Financial Service (MFS) guidelines set by Bangladesh Bank. While historical precedents, such as the initial operations of Grameen Bank without MRA authorization, indicate possible pathways for new initiatives, any future partnerships must adhere to formal legal processes.

Furthermore, the financial viability of a Nano loan initiative presents another challenge. Given the small size of Nano loans, the associated capital costs could be significant, making it difficult for a single organization to sustain the service profitably. Additionally, the existing market infrastructure may not be fully prepared to support the widespread adoption of Nano loans. For instance, the transactional system must be capable of facilitating seamless loan disbursements and repayments through mobile devices to ensure user convenience and minimize operational costs. If borrowers are required to cash out their loans at customer service outlets, this could increase operational costs and deter potential users, driving them towards informal lending sources instead.

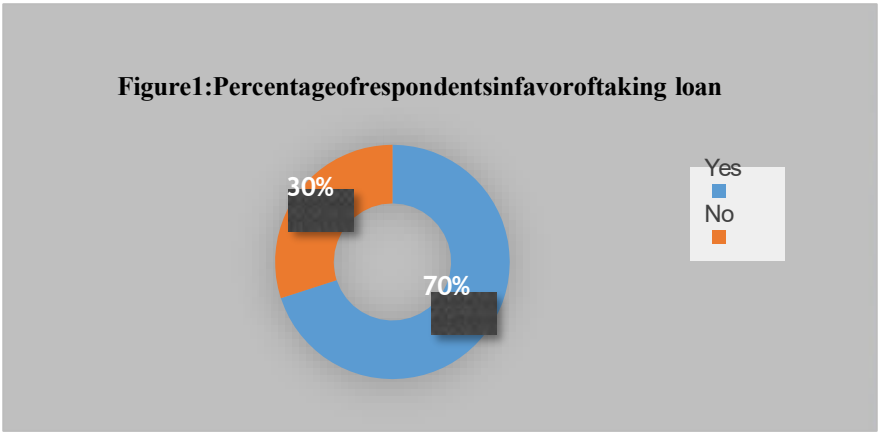
Cultural factors also play a crucial role in the acceptance of Nano loans. In Bangladesh, borrowing is sometimes viewed as socially unacceptable, particularly in the predominantly Muslim population, where it

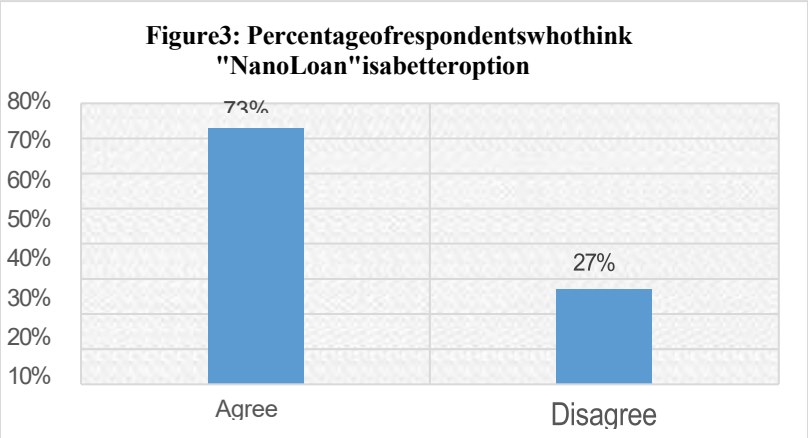
may be considered contrary to religious beliefs. This cultural perspective may influence individuals to avoid formal loan systems, preferring instead to seek financial support from family members. Nonetheless, a substantial proportion of respondents indicated that they rely on loans to maintain their standard of living when expenditures exceed income, highlighting the potential utility of Nano loans in addressing urgent financial needs.

Moreover, 73% of respondents expressed that a Nano loan system would simplify their financial management by eliminating the need for face-to-face borrowing during emergencies. This positive perception underscores the potential impact of Nano loans in improving financial accessibility and social mobility.

Among the surveyed respondents, 70% indicated that they had previously taken loans, while 30% cited various reasons for abstaining. Cultural factors play a crucial role, particularly among the predominantly Muslim population, where borrowing may be perceived as socially unacceptable. Additionally, concerns arise regarding the potential impact of new loan systems on societal productivity, driving many individuals to seek financial assistance from family members rather than formal sources. Nevertheless, a significant portion of loan recipients reported that they rely on loans to maintain their standard of living when expenditures surpass income levels (see Figure 2 in the Appendix).

Moreover, 73% of respondents agreed that the Nano loan system would simplify their financial management, as it would eliminate the need for face-to-face borrowing during emergencies (see Figure 3). This perception underscores the potential of Nano loans to positively influence financial accessibility and social mobility.





Establishing this system alone is unlikely to be profitable for any organization due to the small loan amounts, which generate high capital costs, and the lack of familiarity among the population. Existing companies may face fewer challenges, but another significant issue lies in market readiness. The transaction system must be prepared, as circulating these loans involves supplementary costs. Frequent "cash in" and "cash out" transactions not only incur additional expenses but also create inconvenience for clients. For instance, if a loan is taken, the system should allow repayments via cellphone without the need for cash withdrawals. Currently, our system is not equipped for this. If customers must visit service outlets to withdraw money, operational costs will not decrease but rather increase.

As a result, people might seek alternative sources for loans to avoid this hassle. Among 100 respondents, 70 percent have taken loans, while 30 percent have not. Those who avoid loans often cite reasons such as religious beliefs—many in Bangladesh, being Muslim, consider taking loans to be disrespectful—or concerns that the system might make the younger generation unproductive. They prefer financial support from family members. However, most people who do take loans have compelling reasons for doing so. As shown in Figure 2 (see appendix), a significant number of people rely on loans to maintain their lifestyle when their expenditures exceed their income.

Moreover, 73 percent of respondents agreed that a Nano loan system would simplify their lives, while 27 percent disagreed (Figure 3). Many believe that having access to loans via cell phones would eliminate the need to seek help from others during emergencies and contribute to overall societal well-being.

In summary, while there is clear demand for Nano loans in Bangladesh, several critical challenges must be addressed to ensure the successful implementation of this financial service. These include enhancing financial and digital literacy, navigating regulatory frameworks, ensuring financial viability, and addressing cultural considerations. Overcoming these challenges will be essential to realizing the full potential of Nano loans in integrating underserved populations into the formal financial system.

5.2. Integrating Unbanked Informal Populations into the Formal Financial System

Although NGOs and MFIs offer a wide range of services aimed at assisting the extremely poor, a significant portion of the population remains unaware of the financial options available to them. This lack of awareness contributes to information asymmetry, limiting the effectiveness of these services. To address this knowledge gap, it is essential to implement effective communication strategies that utilize mobile technology as a primary

outreach tool. These strategies should include well-designed promotional activities to ensure widespread awareness of the available financial services.

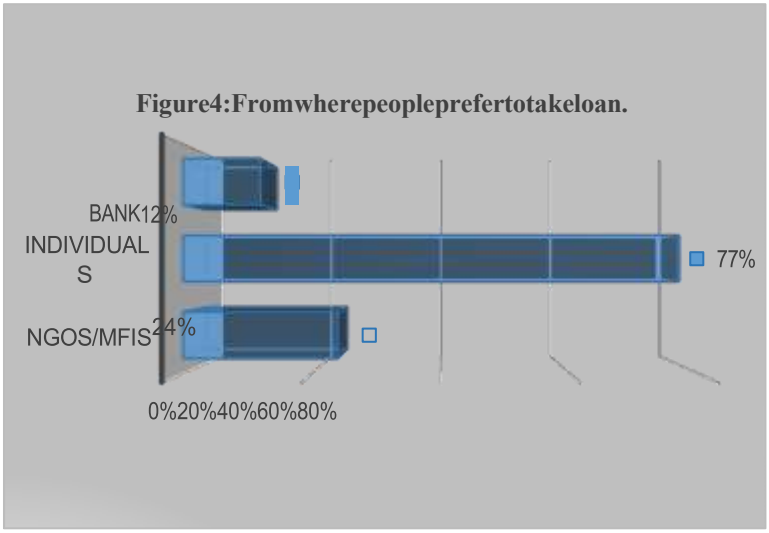
As illustrated in Figure 4, 77% of respondents who have taken loans indicated a preference for borrowing from individuals, while only 24% favored NGOs/MFIs, and just 12% chose banks. This preference can be attributed to the relative simplicity of informal borrowing arrangements, which typically involve fewer formalities, and a lower perceived stigma compared to institutional lending. Additionally, approximately 88% of respondents reported never having taken loans from banks, highlighting a broader trend of distrust or reluctance toward formal financial systems.

The research also uncovered troubling trends regarding the education levels of respondents, with 26% lacking any formal education and 33% possessing only basic literacy skills (see Table 1). This educational deficit may impede potential borrowers from effectively utilizing modern financial technologies. Although digital solutions, such as smartphone applications, could facilitate easier access to Nano loans, most respondents (61%) reported using basic mobile phones solely for making calls, which limits their engagement with more advanced financial platforms.

While Bkash has made significant progress in promoting its services, many users still prefer conducting transactions in person at customer service centers, undermining the efficiencies associated with mobile banking. For the effective deployment of the Nano loan system, it is crucial to initially design the system to accommodate users who do not have access to smartphones, while gradually building awareness and improving digital literacy across the population.

Launching awareness campaigns and educational initiatives will be key to fostering acceptance of Nano loans, with additional support from government-led efforts to enhance financial literacy. For instance, Bangladesh Bank's initiatives currently allow the extremely poor to open bank accounts with minimal fees, facilitating their entry into the formal banking system. A similarly structured approach to Nano loans could significantly advance financial inclusion among unbanked populations.

As the global financial landscape continues to shift toward digitization, it is imperative that Bangladesh's financial system evolves to incorporate advanced technologies that enable the seamless integration of informal sectors into formal systems. Although challenges will undoubtedly arise in establishing a Nano loan framework, successfully engaging unbanked populations is attainable through sustained collaboration and commitment from all stakeholders.



5.3. The Challenges Associated with Microloans Can Be Partially Addressed Through Nano Loans

The implementation of Nano loans holds the potential to partially alleviate the difficulties associated with conventional microloans. Microloan programs have historically encountered various issues, including political obstacles, geographic barriers, and significant costs related to establishing new outlets. Grameen Bank's initial microloan model involved lending to female groups to minimize default risk. However, this approach inadvertently fostered a group shaming culture, discouraging some individuals from participating in the loan process. In response, Grameen Bank has shifted its strategy to offer loans on an individual basis, effectively alleviating this concern.

Survey results indicate that 45% of respondents have never utilized microloans, while 20% identified problems with NGOs and MFIs related to microloan access, and 35% reported no issues at all (see Figure 5). By transitioning to a mobile-based Nano loan service, NGOs and MFIs could significantly reduce operational costs since clients would receive loans directly through their mobile devices, bypassing lengthy, bureaucratic processes. The digitization of these processes would minimize paperwork and cash handling, enhancing efficiency.

Despite the efficacy of NGOs and MFIs, these institutions often impose high-interest rates, create considerable pressure on borrowers, and maintain complicated systems that result in delayed loan disbursement and penalties for late repayments. Notably, Grameen Bank does not extend microloans to men. With Nano loans, the need for direct, in-person interaction would be diminished; however, larger loan requests would still require personal meetings, as assessments cannot rely solely on mobile usage records.

Full digitalization and technological advancement are prerequisites for NGOs and MFIs to extend larger loans via mobile platforms. While Nano loans are a novel concept that is gaining traction, traditional microloans have established themselves as a favored option among borrowers due to their alignment with sustainable development goals. Microloans are designed to enable individuals to embark on entrepreneurial ventures that contribute positively to economic growth. Conversely, Nano loans may function more as emergency financing solutions rather than as tools for long-term development.

Public perception favors the established microloan model; thus, Nano loans may not attain the same level of popularity, especially as many existing borrowers claim that microloans are insufficient for initiating new

projects. MFIs and NGOs face significant challenges in loan recovery, which can incur high operational costs. It is anticipated that the collection process for Nano loans may encounter similar difficulties.

While the two systems—microloans and Nano loans—serve distinct objectives, it is crucial to recognize that both face unique challenges. Nano loans can address certain issues prevalent in the microloan framework, offering an alternative solution for individuals requiring immediate financial assistance. Notably, survey findings reveal that 62% of respondents use loans primarily for emergencies, while about 27% do so due to insufficient income, reinforcing the notion that Nano loans can effectively support individuals during critical financial situations.

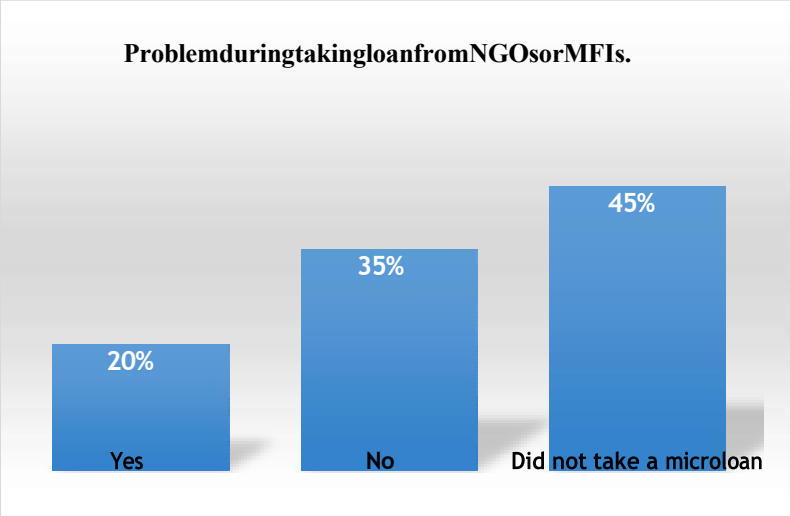
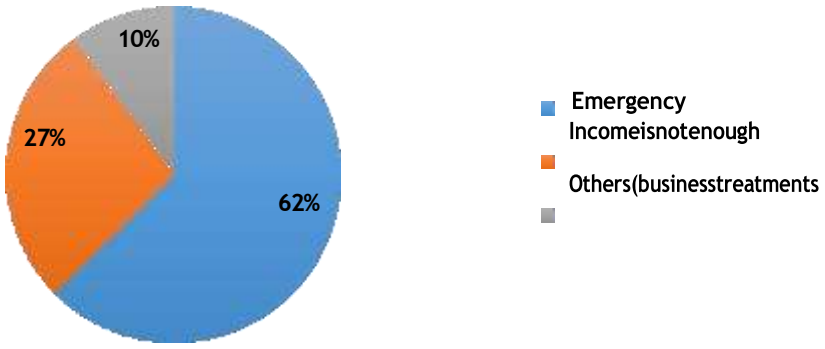


Figure 6 illustrates that 62 percent of respondents take loans primarily for emergencies, while only a small fraction borrows for other purposes. Additionally, 27 percent take loans due to insufficient income. This indicates that Nano loans have the potential to effectively support individuals during emergencies.

NOT SURE IF THIS PART FITS IN GIVEN THAT UNTIL NOW WE HAVE DISCUSSED THAT NANO LOANS ARE NOT YET OFFERED IN BANGLADESH

Figure6:Reasonsbehindtakingaloan.



Success and Limitations of Nano Loans in ~~Bangladesh,~~ India, and Pakistan: A Comprehensive Review

Nano loans have become an important tool for fostering financial inclusion in areas with massive unbanked populations, particularly in Bangladesh, India, and Pakistan. These small, quick loans are designed to offer instantaneous get right of entry to credit score for folks that are historically excluded from formal banking offerings due to the absence of collateral or a credit history. While the advent of nano loans in these areas represents massive development, several obstacles, along with excessive interest quotes, have hindered their capability effect. Moreover, even though the launch of nano loans in India and Pakistan is regularly mentioned as a fulfillment, important information concerning the deployment, reception, and common effectiveness of these packages remain scarce.

Limitations of Nano Loans in Bangladesh

In Bangladesh, nano loans were launched via bKash—a mobile financial services provider—in partnership with City Bank, Dhaka Bank, and Prime Bank. The objective of those loans became to provide low-income individuals with fast access to small quantities of credit. Despite these intentions, the gadget faces several obstacles that prevent it from completely reaching its dreams.

The important limitation is the high interest rates associated with nano loans. These prices commonly variety from 15% to 25%, making the loans financially unsustainable for plenty low- income borrowers. The loans are designed to be repaid over quick periods, which, while combined with the excessive interest rates, often outcomes in financial pressure for debtors. Many recipients discover themselves trapped in a cycle of debt, unable to repay the principal and interest in the stipulated time frame, further exacerbating their economic vulnerability. In some instances, these people are compelled to take out additional loans to cover present ones, as a result perpetuating a cycle of indebtedness.

Furthermore, even as the aim of nano loans in Bangladesh is to encompass underserved populations, the model has yet to effectively reach the intense poor. Institutions like Grameen Bank, which pioneered the

idea of microfinance, targeted especially on empowering the extreme terrible, however bKash's nano loans have in large part focused the lower-center-profits phase of the population. The excessive poor, who often lack get admission to mobile phones, virtual structures, or maybe simple economic literacy, continue to be out of doors the reach of this system. Therefore, despite the technological advancements that nano loans represent, the goal demographic of those loans does now not overlap sufficiently with the maximum financially vulnerable segments of society.

Additionally, the infrastructure helping nano loans in Bangladesh remains underdeveloped in rural areas. Although bKash has an extensive user base in urban and semi-urban regions, rural populations frequently lack the technological get right of entry to necessary to advantage from nano loans. This digital divide further limits the geographical reach of nano loans and stops them from becoming an honestly inclusive monetary product.

The Launch and Success of Nano Loans in India

India's journey into launching nano loans has been closely tied to the country's broader push for digital monetary inclusion through initiatives along with Digital India and the Pradhan Mantri Jan Dhan Yojana (PMJDY). These initiatives, combined with the extensive-scale adoption of Aadhaar, the national biometric identification device, have enabled tens of millions of previously unbanked individuals to access formal economic offerings, which include nano loans.

The Aadhaar system has been instrumental in allowing virtual lending platforms to authenticate borrower identities with minimal documentation. As a result, nano loans can be dispensed quickly, often within minutes, without requiring conventional financial histories or paperwork. Fintech systems inclusive of Paytm, Mobikwik, and Google Pay have been key drivers inside the nano loan space, presenting small-price tag loans to tens of millions of people.

As of 2023, India had over 260 million nano loan clients, demonstrating the sizable reputation and use of those products (Reserve Bank of India, 2023). For instance, Paytm Postpaid alone reported 50 million active users in 2023. The Reserve Bank of India (RBI) also reported a 30% year-on-year increase in the nano loan phase, pushed in most cases through the use of extended demand for immediate, available credit score amongst low- to middle-earnings people.

However, regardless of the rapid adoption, numerous boundaries remain. One key problem is the high interest rates, which can vary from 15% to 35%. A 2021 RedSeer survey indicated that while 65% of clients were happy with the ease and convenience of nano loans, many borrowers in decrease earnings brackets expressed issues about the affordability of these loans due to excessive interest costs. Additionally, while the adoption of nano loans has grown extensively, traditional banking institutions in India nevertheless dominate the financial landscape, with over 760 million active savings debts as of 2023 (RBI, 2023). Nano loans, while emerging in popularity over time, have not yet attained a degree of penetration that threatens the dominance of traditional banks.

In terms of purchaser pleasure, nano loans in India have usually been perceived positively, mainly among the tech-savvy younger demographic. However, pride levels drop among rural and lower- income users, as they struggle with the quick payment intervals and the absence of training regarding loan terms and conditions. These factors make contributions to higher default rates and financial misery for some of the most vulnerable

borrowers.

The Launch and Success of Nano Loans in Pakistan

In Pakistan, the nano loan landscape has evolved in a completely different way compared to India. Instead of being driven by means of traditional banks or fintech companies, the nano loan environment in Pakistan have been predominantly led by telecom organizations, along with mobile wallet systems such as JazzCash and Easypaisa. These structures have capitalized on the massive adoption of cell wallets to attain underserved populations, particularly in rural areas where formal banking offerings are restrained.

The State Bank of Pakistan (SBP) has actively encouraged monetary inclusion through its National Financial Inclusion Strategy (NFIS), which ambitions to expand financial offerings for the country's unbanked populace. As part of this method, the Telecommunications and Digital Financial Services zone has played an important role in extending nano loans to millions of Pakistanis. As of 2023, telecom-led systems had issued over 30 million nano loans, marking a massive increase from 8 million in 2020 (State Bank of Pakistan, 2023).

In terms of customer satisfaction, a 2022 survey determined that 70% of borrowers expressed satisfaction with the convenience and accessibility of nano loans, particularly due to the seamless integration with mobile wallets (Karandaaz Pakistan, 2022). However, high interest rates—ranging from 20% to 40%—have emerged as a number one adversity. Additionally, the shortage of financial literacy amongst many rural borrowers has resulted in confusion regarding loan terms, leading to higher default rates.

Despite these challenges, the telecom-led model in Pakistan has proved to be particularly impactful in reaching rural populations who are normally excluded from conventional banking services.

However, the nano loan market in Pakistan remains small compared to the wider monetary area, accounting for just 8% of the general consumer credit score market (State Bank of Pakistan, 2023). Traditional banking nonetheless dominates with 58 million active account holders, highlighting the significant gap that nano loans have not yet been able to bridge.

Potential Blockchain Technology as a Solution for Nano Loans in Bangladesh

The integration of blockchain generation into the nano loan system in Bangladesh gives a transformative approach to the limitations currently confronted through traditional credit scoring mechanisms. In the context of nano loans, wherein borrowers often lack formal financial histories or collateral, blockchain technology has the capacity to provide a decentralized, transparent, and stable method of comparing creditworthiness. This could be a critical step in overcoming one of the key barriers to economic inclusion: the reliance on conventional credit scoring systems, which tend to exclude the unbanked and underbanked populations.

1. How Blockchain Works in the Context of Nano Loans

Blockchain generation operates as a disbursed ledger, which means that each one transactions and information are recorded in a decentralized network of computers (or nodes), making sure transparency, immutability, and safety. Each block within the chain carries a list of transactions or records entries, and as soon as a block is delivered, it cannot be altered or deleted, making sure a tamper-proof file of each transaction.

In the case of nano loans, blockchain can be used to create a decentralized credit scoring systems. Rather than relying on traditional financial facts, blockchain allows lenders to assess creditworthiness via alternative data sources. For instance, a borrower's records of mobile payments, application invoice bills, or e-commerce

transactions will be captured and stored on a blockchain. This record would function a dependable indicator of a borrower's monetary behavior, even though they do no longer have a formal credit score history with a financial institution or economic institution.

Blockchain's key features—decentralization, transparency, and protection—permit creditors to make more knowledgeable selections, at the same time as additionally imparting borrowers with greater manage over their very own economic statistics. Importantly, blockchain ensures that the information used to assess creditworthiness is steady and cannot be manipulated, accordingly decreasing the threat of fraud.

2. How Blockchain Replaces Traditional Credit Scoring Systems

In the traditional credit scoring model, economic institutions investigate a borrower's creditworthiness primarily based on a centralized set of monetary data, which include financial institution account balances, previous loan histories, and income levels. However, this model often excludes people who do now not have get right of entry to formal financial services, which is a substantial part of the populace in Bangladesh. Blockchain, on the other hand, enables a decentralized gadget where the lender can get right of entry to non-conventional resources of records to evaluate credit risk.

Here's how blockchain technology can replace conventional credit scoring systems in Bangladesh:

Decentralized Credit Histories: Blockchain permits borrowers to construct a decentralized credit score profile using metadata from diverse financial portals such as cell money transactions, peer-to-peer payments, e-trade, and utility payments. For instance, a borrower's records of repaying mobile phone payments or regularity in sending money via mobile monetary offerings (which includes bKash or Nagad) may be captured at the blockchain ledger. This record is verifiable, obvious, and stored in an immutable format, making it difficult for debtors to falsify records.

3. Increased Transparency and Trust: In a blockchain system, every transaction is seen to all contributors inside the network, ensuring entire transparency. Since facts are stored across a couple of nodes, there is no single point of failure, and no entity can regulate the facts as soon as they're uploaded. For lenders, this indicates they can get entry to real-time, accurate facts on a borrower's monetary behavior, which allows in evaluating creditworthiness without relying totally on conventional credit scores. For borrowers, blockchain gives the gain of manage over their own economic facts, as they can choose to share best the data they wish to disclose.

4. Metadata as Proof of Creditworthiness: In blockchain-enabled nano loan systems, metadata performs a critical position in establishing the trustworthiness of borrowers. Metadata refers to information this is generated for the duration of economic transactions, including the frequency and timeliness of bills, the varieties of goods or offerings bought, and spending styles. For instance, if a borrower frequently makes small bills to vendors via cell payments, this interest can be used as proof of accountable financial behavior. Blockchain captures this metadata and compiles it into a complete profile of the borrower's financial behavior, which serves as an alternative to a proper credit score.

5. Reducing Risk and Enhancing Inclusion: Blockchain's ability to assess creditworthiness through a broader variety of information helps lessen the hazard for creditors, making it viable to extend loans to those who have been formerly taken into consideration too risky under traditional models. For example, a borrower

who lacks a formal job or bank account but consistently pays for utilities or sends remittances through mobile platforms could still qualify for a nano loan under a blockchain-enabled system. This could dramatically expand the pool of eligible borrowers and make financial inclusion more attainable for Bangladesh's unbanked and rural populations.

Potential Impact of Blockchain on the Nano Loan System in Bangladesh

The introduction of blockchain technology into Bangladesh's nano loan ecosystem could address several of the limitations that are currently hindering the system's potential:

1. **Overcoming the High-Interest Barrier**: One of the primary reasons for high interest rates in nano loans is the perceived risk associated with lending to borrowers without credit histories. By providing alternative ways to assess creditworthiness through metadata, blockchain could significantly reduce the risk premium that lenders currently charge, potentially leading to lower interest rates. This would make nano loans more affordable and sustainable for low-income borrowers.
2. **Reaching the Extreme Poor**: Blockchain technology can be a crucial tool in extending nano loans to rural and extremely poor populations who may lack formal financial access but still engage in frequent financial activities through mobile wallets or informal economies. By leveraging blockchain to capture this activity, lenders can assess these individuals' financial behaviors and provide access to credit where it was previously unavailable.
3. **Reducing Fraud and Increasing Trust**: In Bangladesh, where financial fraud and lack of trust in formal institutions can be barriers to financial inclusion, blockchain's tamper-proof and transparent nature can enhance trust between borrowers and lenders. Because all data on the blockchain is immutable and verifiable, it reduces the risk of fraudulent activity and makes the entire lending process more secure.
4. **Regulatory Compliance and Oversight**: Finally, blockchain can provide regulatory authorities with a more transparent view of the nano loan market. Since every transaction and credit decision is recorded on the blockchain, regulators can more easily monitor compliance with lending rules and ensure that borrowers are not being exploited by unfair interest rates or terms.

Incorporating blockchain technology into Bangladesh's nano loan gadget represents a promising step in the direction of addressing some of the most massive demanding situations the sector faces, which include high interest rates, limited financial inclusion, and the exclusion of the extreme poor. By using metadata to build decentralized credit score profiles, blockchain can update traditional credit scoring structures, proving whether a borrower is eligible and trustworthy without the want for formal financial histories. This shift could not only reduce interest rates through mitigating lender danger however additionally extend availability of credit for the unbanked population, aiding Bangladesh towards universal financial inclusion.

Security Issues in Integrating Blockchain Technology with Nano Loan Banking Systems

Although the integration of blockchain technology into corporate nano banking systems in Bangladesh is promising, but it also raises several security concerns that must be addressed to guarantee the integrity and reliability of the system. These concerns include data privacy, potential of cyber-attacks as well as compliance

and challenges related to changing blockchain records. Below are the main security points to consider:

1. Data Privacy and Confidentiality

Although blockchain provides a transparent and decentralized framework for recording transactions, but they can also reveal sensitive financial information. In a typical blockchain setup transaction details are available to all participants in the network. This openness may pose a significant risk to borrower privacy. This is especially true if personal data is not adequately disclosed or encrypted. In the case of nanowires, users can share sensitive financial information. It is important to secure data to maintain trust in the system.

To reduce this risk, solutions such as private blockchains or permissioned blockchains may be used. In a permissioned blockchain access to data can be restricted to authorized participants. This helps ensure that sensitive information is only accessible to those with authority.

2. Cybersecurity Threats

Although blockchain technology is inherently secure due to its decentralized nature, it cannot withstand the risks of cyberattacks such as DDoS (Distributed Denial of Service) attacks, phishing, or vulnerabilities in smart contracts. It can undermine the integrity of the nano loan system, for example, if cybercriminals are able to infiltrate the network, they can manipulate transaction data or disrupt services. This leads to financial losses for both lenders and customers.

To counter these threats strong cyber security measures are required including regular safety inspections, penetration testing and the use of advanced encryption techniques to ensure data integrity.

3. Immutability vs. Errors

One of the defining characteristics of blockchain is its immutability. When registering information for the first time, it cannot be changed or deleted. Although this feature is useful for maintaining tamper-proof records, it also faces challenges when failures or errors occur, for example, if a borrower's transactions are recorded incorrectly due to errors or fraud, there must be means to correct the mishap. Lack of the ability to modify records can have negative consequences for borrowers, such as being incorrectly marked as unreliable. Implementing clear protocols for failure ranking and remediation within a blockchain framework is essential to addressing this concern. This may involve putting in place secondary systems that allow verification of transactions or correcting communications between involved parties in the case of discrepancies.

4. Regulatory Compliance

As blockchain technology continues to evolve, the regulatory framework is also adapting to the changing landscape in Bangladesh, where the financial sector is highly regulated. Combining blockchain with nano loan systems raises questions about compatibility with existing financial laws and regulations. Regulators must develop clear guidelines on how blockchain should be used. This includes data management practices, KYC (know your customer) requirements and anti-money laundering measures.

Lack of compliance with regulatory standards can lead to legal consequences for financial institutions and the loss of public trust. Early involvement of regulators in the process of implementing blockchain will be of great importance to ensure that all legal requirements are met.

5. Lack of Understanding and Expertise

Integrating blockchain technology into nano loan banking requires specialized knowledge and expertise. Many financial institutions may lack the necessary capabilities to effectively operate and manage blockchain systems. This lack of understanding can lead to misuse that makes the system too sensitive.

In response to this challenge financial institutions must invest in employee development and training to promote a culture of innovation and technical competence. Collaboration with blockchain experts and technology partners can also provide valuable insights into best practices and security protocols.

Although blockchain technology offers significant opportunities to improve the nano loan banking system in Bangladesh, it is important to address related security issues in a comprehensive manner. Addressing the concerns of security of data owners, protection against cyber threats, tackling unique challenges, compliance and promotion of expertise is essential in building a safe and functional blockchain-based ecosystem for nano loans. Only then stakeholders will be able to harness the full potential of blockchain technology and achieve financial inclusion and empowerment of the underserved population in Bangladesh.

Conclusions

The potential of Nano loans to revolutionize financial inclusion in Bangladesh is both promising and profound. This research has illuminated the critical gaps in the current microfinance framework, particularly the challenges that hinder the most vulnerable populations from accessing traditional financial services. While microloans have long been heralded as a tool for poverty alleviation, their limitations—ranging from high-interest rates and complex processes to social stigma—have prevented them from reaching their full potential. Nano loans, with their ability to leverage mobile and blockchain technology, present a compelling solution to these challenges.

By seamlessly integrating into the existing digital infrastructure, Nano loans can evade many of the barriers that have historically excluded the poor from formal financial systems. They offer a simplified, more accessible alternative that caters to the urgent, short-term financial needs of individuals who are often overlooked by traditional microfinance institutions. The ability to process loans through mobile devices not only reduces operational costs for NGOs and MFIs but also empowers borrowers by providing them with a private, efficient, and user-friendly financial tool.

However, the successful implementation of Nano loans requires a multifaceted approach. It is essential to address the technological and knowledge gaps that could hinder adoption, particularly among populations with low literacy levels. Additionally, regulatory frameworks must evolve to support the unique nature of Nano loans while ensuring consumer protection. Strategic partnerships between financial institutions, mobile operators, and regulatory bodies will be crucial in creating a sustainable and scalable Nano loan ecosystem.

While Nano loans may not entirely replace traditional microloans, they have the potential to complement and enhance existing financial services by filling critical gaps in the market. They can provide a lifeline during emergencies, reduce reliance on informal lenders, and ultimately contribute to the broader goal of financial inclusion. The road to widespread adoption may be filled with challenges, but the benefits that Nano loans could bring to Bangladesh's unbanked populations are undeniable.

In conclusion, Nano loans represent a significant step forward in the quest to democratize financial access. By embracing this innovative approach, Bangladesh could lead by example in the global movement toward inclusive finance. With careful planning, robust regulatory support, and a commitment to addressing the needs of the most marginalized, Nano loans could transform the financial landscape, offering millions of people a pathway out of poverty and into economic empowerment.

Additionally, with neighboring countries such as India and Pakistan already implementing Nano loan systems, it is reasonable to anticipate that similar services can be developed in Bangladesh. This research underscores the need for further investigation into Nano loans to enhance understanding among the general populace, NGOs, MFIs, mobile operators, and policymakers, thereby promoting informed decision-making regarding the deployment of Nano loan services.

Bibliography

1. Ahmed, S., et al. (2015). A Study of Mobile Application Usage in Bangladesh. *SSRG International Journal of Computer Science and Engineering (SSRG-IJCSE)*, 2(4), 1-9.
2. Anaysi, F. I., &Otubu, P. A. (2009). Mobile Phone Technology in Banking System: Its Economic Effect. *Research Journal of Information Technology*, 1(1), 1-5.

3. Armendariz de Aghion, B., & Morduch, J. (2005). *The Economics of Microfinance*. MIT Press. Asian Development Bank. (2017, April). *2016 Annual Report of the Asian Development Bank.*
4. Bateman, M. (2010). *Why Doesn't Microfinance Work? The Destructive Rise of Local Neoliberalism*. Zed Books.
5. Beck, T., Demirgüç-Kunt, A., &Maksimovic, V. (2005). Financial and Legal Constraints to Growth: Does Firm Size Matter? *The Journal of Finance*, 60(1), 137-177.
6. CGAP. (2015). *Digital Financial Inclusion*. Retrieved from https://www.cgap.org
7. Datta, D. (2004). Microcredit in Rural Bangladesh: Is It Reaching the Poorest? *Journal of Microfinance*, 6(1), 55-81.
8. Donovan, K. (2012). Mobile Money for Financial Inclusion. In World Bank (Ed.), *Information and Communications for Development 2012: Maximizing Mobile* (pp. 61-73).
9. Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, Financial Development, and Growth. *Journal of Development Economics*, 90(1), 144-152.
10. Haque, M. S., &Yamao, M. (2008). Can Microcredit Alleviate Rural Poverty? A Case Study of Bangladesh. *World Academy of Science, Engineering and Technology*, 46, 648-656.
11. Hossain, M. S., & Russel, A. H. (2017). Picture of the Socio-Economic Development of Rural People of Bangladesh through Mobile Financial Services: A Study on Bkash. *European Journal of Business and Management*, 9(36), 1-10.
12. Islam, A. (2018). Financial Inclusion in Bangladesh: The Role of Mobile Financial Services. *Journal of Asian Finance, Economics and Business*, 5(1), 49-58.
13. Jack, W., & Suri, T. (2011). Mobile Money: The Economics of M-PESA. *NBER Working Paper No. 16721*.
14. Kabir, E. M., Islam, B. M., &Inam, T. M. (2013). Uniform Payment System for Banking Industries: A Case Study in Bangladesh. *International Journal of Computer and Electronics Research*, 2(2), 25-33.
15. Karim, L. (2008). Demystifying Micro-Credit: The Grameen Bank, NGOs, and Neoliberalism in Bangladesh. *Cultural Dynamics*, 20(1), 5-29.
16. Khandker, S. R. (1998). *Fighting Poverty with Microcredit: Experience in Bangladesh*. Oxford University Press.
17. Khatun, F., et al. (2013). Why Some Poor Women in Bangladesh Do Not Opt for Microcredit? *Journal of Bangladesh Agricultural University*, 11(2), 285-292.
18. Meyer, R. L. (2002, May 20). The Demand for Flexible Microfinance Products: Lessons from Bangladesh. *Journal of International Development*, 14, 351-368.
19. Musari, K. (2017, May). Nano Finance: Addressing the Islamic Microfinance Gap through Global Islamic Humanitarian Institution. Paper presented at the Conference on Philanthropy for Humanitarian Aid.
20. Nath, M. (2004). *History of Microfinance in Bangladesh*. Dhaka: BRAC University Press.
21. Obaidullah, M. (2008). Role of Microfinance in Poverty Alleviation: Lessons from Experiences in Selected IDB Member Countries. *Islamic Development Bank.*
22. Pitamber, S. (2003). Factors Impeding the Poverty Reduction Capacity of Micro-Credit: Some Field Observations from Malawi and Ethiopia. *African Development Bank*, Abidjan, Côte d'Ivoire.
23. Quadir, K. (2015, March 8). The Story of Bkash. *The Daily Star*. Retrieved from

https://www.thedailystar.net/the-story-of-bkash-21235

24. Quinones, B., &Remenyi, J. (2014). *Microfinance and Poverty Alleviation: Case Studies from Asia and the Pacific*. Routledge.
25. Rahman, M. (2019). Exploring the Potential of Mobile-Based Nano Loans in Bangladesh. *Journal of Financial Services Research*, 46(3), 351-370.
26. Rizzi, A., Barris, I., & Rhyne, E. (2017, September). Tiny Loans, Big Questions: Client Protection in Mobile Consumer Credit. *Center for Financial Inclusion*. Retrieved from https://content.centerforfinancialinclusion.org/wp-content/uploads/sites/2/2017/09/Smart_Brief_Tiny_Loans_Big_Questions_Final_092617.pdf
27. Seibel, H. D. (2005). Does History Matter? The Old and the New World of Microfinance in Europe and Asia. *Estudios de Economía*, 32(2), 109-134.
28. Simanowitz, A. (2003). *Ensuring Impact: Reaching the Poorest While Building Financially Self- Sufficient Institutions, and Showing Improvement in the Lives of the Poorest Women and Their Families*. DFID.
29. Sultana, B., & Khan, M. M. R. (2016). Are Mobile Financial Services Promoting Financial Inclusion in Bangladesh? *Research Department of Bangladesh Bank*.
30. Westover, J. (2008). The Record of Microfinance: The Effectiveness/ Ineffectiveness of Microfinance Programs as a Means of Alleviating Poverty. *Electronic Journal of Sociology*, 12(1), 1-8.
31. World Bank. (2009). The Impact of Banking the Unbanked: Evidence from Mexico. *World Bank*. World Bank. (2015). *2014-2015 Annual Report of the World Bank*.
32. Yunus, M., &Jolis, A. (1998). *Banker to the Poor: Micro-Lending and the Battle Against World Poverty*. PublicAffairs.