



**A Study of Digital Transformation in the Microfinance Landscape of  
Bangladesh**

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### Abstract

This research aimed at digital transformation in the microfinance institutions of Bangladesh. Microfinance in Bangladesh is a dominant tool for financial inclusion. In 1983 Grameen Bank introduced microfinance in Bangladesh, to the progress of vibrant microfinance. Over the years, in Bangladesh microfinance has transformed digitally with competition worldwide and extensive mobile phones, tablets, and agent banking. The research focuses on Technological adoption assessment, Thoughtful risk management, Findings customer perspectives, and Challenges and opportunities analysis of digital transformation in microfinance institutions in Bangladesh. This digital transformation has enabled loan disbursement, realization process, development of credit scoring, financial reports, and introduced online platforms to employees and clients. On the other hand, digital transformation advancement, challenges, and continued data security underscore this effort and utilize the benefit of digital transformation at microfinance in Bangladesh ensuring sustainable development.

Survey findings imply mixed opinions from respondents about the digital transformation of MFIs. Cybersecurity threats, data privacy, and technical issues are the most important concerns. Respondents are suggested to the staff training, develop a security system and regular risk assessment for risk mitigation strategies. Increased accessibility through mobile banking, faster loan processing, and digital innovation can improve customer satisfaction. However, challenges address regulatory complications, internet access, and Data privacy concerns. Focus on infrastructure development, measures cybersecurity, and balanced regulatory attitude collaboration with regulators and technology providers is necessary for digital transformation in the microfinance sector.

This research concludes with opportunities for technological innovation, financial inclusion, customer satisfaction, and socio-economic development despite the challenges of digital transformation in microfinance sectors in Bangladesh.

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Language: English

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## 1 Introduction

Digital transformation is modifying technologies in existing business processes to facilitate important outcomes from the digital technology for improving customer satisfaction, and business operations, and introducing innovative ideas for business. With the initiation of digital technologies, microfinance institutions have been promptly restructuring their operation worldwide and in Bangladesh to enhance efficiency, Technological Adoption Assessing, Thoughtful Risk Management, Finding Customer Perspectives, and Financial Impact evaluation. (Sascha, et al., 2021). Digital transformation of the microfinance landscape in Bangladesh, the economy will have impactful changes.

The micro-merchants in Bangladeshi microfinance emphasized credit and financial services. Both the micro-merchant and microfinance institutions need to decrease credit risk in a favorable position. The transformation of digital technologies in microfinance extends financial services, mobile banking, and other digital platforms into operations. Better reason and offer existing digital technologies to the microfinance institutions offer customers' requirements to the micro-merchant segment (UNCDF, 2019).

In Bangladesh, it is possible reducing poverty and fostering the growth of small and medium-sized businesses only for microfinance institutions. Over recent years, microfinance has substantially expanded, particularly in offering to the poor population. The Nobel Laureate Professor Dr. Muhammad Yunus established the microfinance institution in 1970 in Bangladesh. Dr. Muhammad Yunus initially started microfinance only for customers' savings deposit purposes then small loan services trials to individuals in rural regions in Bangladesh. Significant positive changes have been granted by this initiative in the microfinance sector in Bangladesh. such as improving living standards and wealth, developing micro-enterprises, and economic development. Also, investment in microfinance combating poverty and empowering Bangladesh worldwide. Concurrently, the internet and other various opportunities include day by day. Operational frameworks, risk assessments, and ongoing development are all being transformed by digital technology in the microfinance sector. Both innovation and the use of digital technological advancements are essential, since the latter fosters greater inclusivity, fosters greater creativity, and enhances operational efficiency (Moin & Kraiwanit, 2023).

However, some obstacles are facing digital transformation in microfinance sectors. Challenges concerning digital literacy, data security, data privacy, and infrastructural attention present substantial hurdles to effectively executing this transition (Aggarwal, 2021).

This research explores A Study of Digital Transformation in the Microfinance Landscape of Bangladesh. It will explore the success issues, challenges, and potential solutions containing using digital technologies in this sector.

## 1.1 Background of Study

The surroundings have undergone a substantial modification, with digital transformation occurring as the focal point for enhancing operational efficiency and steering innovation throughout the organization. Across various sectors, this change is appearing at a faster pace than ever, accelerating the process of digital transformation. The advantages include heightened revenue, discriminating growth opportunities, and the capability to maintain a competitive advantage (Paul, Adam, & Michael, 2024). The digital revolution of Bangladesh's microfinance sector has the potential to enhance operational competence, enlarge access to financial services, and bolster financial inclusion, thereby abetting poverty alleviation and sustainable economic development objectives.

Nonetheless, obstacles such as insufficient infrastructure, low digital literacy rates, and cybersecurity vulnerabilities need to be undertaken to fully capitalize on the potential benefits of digital developments in microfinance. The importance of Digital technology improvement in the microfinance sector in Bangladesh and its benefits include efficiency and speed transactions, reduced operational costs, improved financial services, increased portfolio management and fraud, and effective accountability (Moin & Kraiwanit, 2023). For instance, technology has been involved in every sector during the COVID-19 pandemic situations. Most of the organizations have been involved in digital transformation systems. University education conducted online services, such as Zoom, Webex, teams, meets, etc.

A deep-rooted curiosity about the connection between technology and financial inclusion, remarkably in the context of Bangladesh's vibrant microfinance landscape. Growing up in Bangladesh, perceived, firsthand the transformative influence of microfinance in inspiring underserved communities and driving socio-economic progress. As technology became more prevalent in our daily lives, we became fascinated by its potential to improve the effectiveness and accessibility of microfinance services, especially in rural areas where conventional banking infrastructure is scarce (Kevin, 2023).



In addition, I have more than 8 years of practical work experience in the microfinance sector. My academic background in digital business and management sparked my interest in the potential of technology to broaden financial access and enhance livelihoods. As I immersed myself in the literature, I noticed a lack of comprehensive research on the intersection of microfinance and digital finance, especially within Bangladesh's context. Motivated by this gap and stimulated by a commitment to inclusive enhancement, I set out to investigate the impact of digital transformation on the microfinance sector in Bangladesh.

The development of the research question evolved through a methodical process, involving a thorough literature review, consultations with industry experts, and firsthand observations during visits to microfinance institutions across Bangladesh. Navigating the challenges of making a hardy research question: Balancing literature review and methodological considerations (Guys & Thomas, 2019). Initially, my inquiry broadly focused on understanding the influence of digital technologies on microfinance operations in the country. However, as my understanding deepened, it became evident that a more targeted approach was necessary.

By carefully analyzing emerging trends, theoretical frameworks, and practical challenges within the microfinance sector, I refined the research question to investigate: "How does the adoption of digital technologies impact the accessibility, operational efficiency, and outreach of microfinance services in Bangladesh, and what are the resulting implications for financial inclusion, digital payment system, mobile banking solution, data analysis, customer relationship management, and socio-economic development?" Throughout the study, this carefully crafted question directed the research methodology and data collection, culminating in a deeper comprehension of how digital transformation fosters financial inclusion and socio-economic progress.

## 1.2 Problem Statement

According to Garherd & Paul (2017) accessing real-time case studies challenge for research faculty, as is securing support from business executives. Moreover, the lengthy publication progression of academic journals often fails to keep pace with the rapid changes of digital transformation. Consequently, by the time an article is published, it may no longer be relevant for organizations relying on updated insights to reshape their business models. Additionally, disciplinary-focused journals must widen their scope to encompass interdisciplinary articles that address the sophisticated and holistic nature of digital transformation.

In this master's thesis, the research problem is investigating risks, and barriers connected with microfinance institutions and assesses the factors while digital technologies hold immense promise for

transforming the microfinance sector in Bangladesh, various obstacles hinder its effective digital transformation, For instance, limited proficiency in digital skills, restricted availability of digital infrastructure, security concerns, complex regulations, customer trust and acceptance, and expansion and sustainability. By undertaking these obstacles, the digitalization of microfinance in Bangladesh could boost financial inclusivity, streamline operations, and encourage relegated populations.

### 1.3 Research Context and Motivation

Research is undertaken to address uncertainties or recognize problems within a phenomenon, regardless of whether they have already occurred or not. It also aims to employ the most effective approaches to resolve these issues, regardless of whether experiments are involved. Writing and publishing research serve primarily to publicize findings and share knowledge with researchers in the relevant fields (Shahrom, et al., 2011). As a result, the digital transformation of microfinance in Bangladesh needs to block the barriers to research, such as insufficient digital literacy, restricted access to digital infrastructure, and concerns regarding sustainability. The research seeks to uncover enhanced financial inclusivity, operational efficiency, risk management, and socio-economic development.

According to Koh (2020) The benefits of research context and motivation depend on the appropriate and individual aspects. Understanding the context and motivation behind research on digital transformation in microfinance in Bangladesh elaborates capacity, influence, importance significance, influence, and capacity to catalyze beneficial changes in the region's financial sector and the overall economy.

### 1.4 Purpose of the Research

The study A Study of Digital Transformation in the Microfinance Landscape of Bangladesh examines the integration of digital technologies into microfinance operations in Bangladesh. It identifies challenges in digital transformation and explores potential solutions to improve financial inclusion, operational efficiency, and economic empowerment for marginalized communities. This work aims to understand the evolving digital transformation in the microfinance landscape of poor Bangladesh. It focuses on the effects of the digital revolution in microfinance and provides financial services on a small scale to low-income people who do not have typical bank accounts. This study seeks to scope and character digital transformation in microfinance (MFI), specifically how the adoption of digital instruments and platforms by microfinance institutions (MFIs) may affect

microfinance operations, outreach, and effect. The goal of this study is to uncover the benefits and drawbacks of MFIs, allowing them to provide better services while reaching out to populations who previously disconnected from official financial services.

Also, the study will look at the social and economic consequences of digital transformation in Bangladeshi Microfinance Institutions (MFIs), focusing on borrowers, MFIs, legislators, and communities. It seeks to investigate how digital transformation creates financial opportunities for poor people and promotes socio-economic progress. The study will also cover responsible digital integration strategies best implementation, legal frameworks, and creative ways. The study intends to promote financial inclusion and long-term growth while incorporating vulnerable groups in technology advantages. The goal is to provide policymakers with a knowledge foundation through evidence-based dynamics, strategic decision-making, and intellectual discussions around digital technology and finance in developing nations.

### 1.5 Objective of Research

The objective of A Study of Digital Transformation in the Microfinance Landscape of Bangladesh is to assess the digital transformation within the microfinance sector of the country. The objectives of this study included are:

1. Technological Adoption Assessing.
2. Thoughtful Risk Management.
3. Finding Customer Perspectives.
4. Challenges and Opportunities analysis of digitalization.

### 1.6 Delimitations of the Study

Delimitations are the confines or restrictions within which a research study is carried out. Delimitation may consider different factors such as time, geographical location, methodological constraints, and data collection method. Some factors considered for the importance of research delimitation, focus validity & reliability, generalized, and clarified scope (Hassan, 2024). Exploring the digital transformation of microfinance sectors in Bangladesh, key delimitations to consider for this research.

- ❑ The research especially examines digital transformation to microfinance within the geographical landscape of Bangladesh. Primary data collection and analysis are limited to the Bangladeshi Microfinance industry.
- ❑ The study examined mixed-method Qualitative and Quantitative methods have complicated to introduce and clarify.
- ❑ The study has relied on primary and secondary data sources. Primary data has been collected through surveys of MFI's employees and customers, and personal work experience in the microfinance industry. Secondary data has been collected from published journals, articles, reports, and websites.

## 2 Literature Review

Sarah (2015) states that the literature review defines concepts of the research of A Study of Digital Transformation in the Microfinance Landscape of Bangladesh and details research directions.

In this thesis, the literature review provides the conceptual foundation of the research. It outlines the thesis's key concepts related to microfinance, technology adoption and transformation in microfinance institutions, digital financial services, the impact of digital transformation of microfinance operations, challenges and barriers of digital transformation, and digital transformation case studies of Pally Bikash Kendra, described in literature review section earlier in the research. The research design and data collection method are discussed in the research methodology.

### 2.1 Literature on digital transformation

According to Hasan (2023) Digital transformation is restructuring and reconfiguring the function of accounting and finance through the utilization of technology finance without changing traditional systems. Such as blockchain, Artificial Intelligence, and cloud computing added to the financial sectors. Bangladesh Bank played a crucial role in digital transformation to develop secure and strong transactions, reduce time, and cost consumption, and introduce pioneering and diverse needs of customers and businesses.

Cloud computing, big data analytics, artificial intelligence, and IoT technologies are transforming industries such as finance, healthcare, manufacturing, and trade. Digital transformation entails implementing digital initiatives and tools to improve processes, structures, and cultures. The intricacy of digital transformation needs an organization's adaptability and mutability. To obtain the necessary technology platform, personnel must grow their skills, experiment, learn from failures, and build an innovative culture. This method assists organizations in establishing the necessary technological foundation, developing employee talent, and learning from mistakes.

According to Mariana & Oksana (2023) the digital revolution is revolutionizing the workforce by changing job needs, skills, and labor market completeness, as well as creating new opportunities and increasing productivity. However, technology causes job displacement and skill mismatches. To overcome this, efforts should be made to reskill workers, encourage digital literacy, and properly distribute benefits. Information and communication technologies (ICT) perform distinctive roles in society, such as poverty alleviation, inequality reduction, and environmental conservation, while encouraging social development and eliminating disparities.

The digital financial landscape harnesses cutting-edge technologies such as RPA, AI, and Big Data Analytics for tasks like data analysis, ensuring privacy, managing ecosystems, and employing diverse tools to bolster efficiency and origination processes. The process of digitalization is insightful conversions in the digital sector and its environment. According to Behuli (2021) implementation of digital strategy to the traditional strategy. There are no structural changes in the financial sectors. Internet technologies are used in the digital financial transformation.

## 2.2 Technological digitalization in the microfinance sector

Bangladesh's financial sector is introducing a strong digital infrastructure and creative products introducing a robust digital infrastructure, creative products by undergoing digital transformation. This progress allows millions to benefit themselves from financial services while refining the efficiency of service delivery.

In the evolving realm of financial services, banks, and microfinance institutions (MFIs) continue to hold a crucial role. The financial needs of underserved communities expand outside digital payments and receipts, individuals also require streets for saving, investing, insurance, and assuring their assets. MFIs, in many aspects, are well-suited to address these demands. However, in the current technological age, they must reconsider their operational approaches. The demographic profile of microfinance clients is anticipated to undergo significant variation in the forthcoming decades, with a shift towards a more tech-savvy, educated, and urban population that harbors distinct expectations. Microfinance sectors include many digital networks using mobile networks.

In order to encourage financial inclusion in underprivileged communities, mobile banking and payment options are essential. Agent banking, digital credit scoring, and mobile platforms like bKash in Bangladesh can help close the gap and end poverty. Transparency, security, and efficiency are provided by blockchain to microfinance organizations. MFIs may better understand consumer needs, provide customized solutions, and reduce risks by utilizing data analytics and business intelligence tools. The safety and security of microfinance mechanisms are guaranteed by digital identity identification techniques such as biometrics.

Financial technology companies execute innovative solutions to improve reconsidering results. MFI uses the Stochastic Frontier Analysis (SFA) approach and offers mobile banking services (Marwa, Mouna, & Feten, 2023). Leveraging digital technology can bring about noteworthy enrichments in Bangladesh's microfinance sector. This renovation can manifest through various advantages, including 1) heightened efficiency and rapidity of transactions, 2) reduced operational expenses, 3) boosted accessibility to financial services for rural and deprived populations, 4) improved

management of loan portfolios leading to diminished default rates, and 5) heightened transparency and accountability. However, some challenges and barriers are addressed to the implementation of digital technology (Moin & Kraiwanit, 2023).

In Bangladesh, almost all microfinance organizations have digitalized except a few large institutions (BRAC, ASA, Sajida Foundation). Most of the institutions use Loan Management System solutions for their organizations which automatically pull data from other applications, for instance, financial information systems and human resource information systems. However, 50% of MFIs showed MIS does not produce graphical dashboards. In Bangladesh, most of the MFIs use third-party loan management system solutions such as Grameen Communication, Data soft, Benchmark, etc. 75 percent of organizations started loan management systems with centralized databases with web-based, real-time. 81 percent used third-party services. 18% of institutions used digitalization of loan disbursement and refund and 19% used cashless loan disbursement, repayment, and savings collection. All the institutions use financial accounting software, 81% use human resource information systems 38% use inventory management systems and asset management. However, a survey showed that 77% of institutions do not have any plans to use AI (UNCDF, 2019).

### 2.2.1 Technological Infrastructure

The technological infrastructure comprehends both hardware and software elements to meet the business's application and information management needs. Key mechanisms of this infrastructure include Computer hardware, Operating systems software, Communication, and networking systems, Tools for development, Software applications, and specialized tools for specific purposes (Gupta & Sushil, 2003). Technology is frequently classified as a meaningful obstacle met by MFIs globally. While adept utilization of technology has the potential to cut down expenses, enhance operational efficiency, and enlarge outreach, numerous MFIs either make suboptimal technology investments or neglect to invest altogether. This hinders their capacity to grow and meet increasing demands.



Figure 1. Technological infrastructure (Experditure, 2023)

Microfinance organizations use technological infrastructure for better performance, to achieve organizational goals and objectives (European Microfinance). Digital Financial Inclusion comprises the delivery of both financial services and access to financial products using innovative digital methods. It serves as the nexus of financial, social, and digital inclusion. Within the realm of digital inclusion, three closely linked components—accessibility, affordability, and digital ability—are vital. For digital technology to effectively enhance financial inclusion, a robust physical infrastructure and comprehensive regulations that safeguard both the demand and supply sides are imperative. Regardless of whether the approach is digital or traditional, it is crucial to tailor all financial services by understanding the specific needs and skills of marginalized groups to ensure inclusivity (Aquib Sadman, 2021).

In this research, personal work experience in the microfinance sectors and surveying in different microfinance institutions authorities, employees, and colleagues share their acquired knowledge



about technological infrastructure. Technological innovation plays a crucial role in enlightening financial services, enhancing operational efficiency, and enlarging outreach for instance, digitalized payment systems, loan applications, disbursement, and repayment, innovative mobile banking, Data Analysis, Digital accounting information systems, digital management information systems, Human resource information system, Regulatory compliance systems means compliance and reporting, monitoring, and audit trails, and also training capacity building. Most of the microfinance organizations in Bangladesh implemented a core banking system with their digital transformation system. All financial transactions, deposits, and loan portfolios are managed digitally. Electronically make transactions to customers with digital payment.

In Bangladesh, most of the big organizations for example, PBK, Shakti Foundation, ASA, and Grameen Bank use the Microfin360 application that allows for computer and mobile banking solutions with personal identification. All types of transactions are possible with this Microfin360 software such as loan management, savings management, transferring money from one account to another, data analysis and credit scoring, customer relationship management system (CRM), and Biometric identification. Technological infrastructure is very crucial for microfinance institutions in business models, client needs, and operational desires.

### 2.2.2 Digital Payment and Receipt System

Digital payments, known as electronic payments (e-payments), refer to transactions conducted through digital or online channels without the participation of physical currency. In this process, value is transferred from one account to another, utilizing digital devices like mobile phones, computers, tabs, or cards such as credit, debit, or prepaid cards. Both the payer and payee, whether individuals or businesses, must possess vital mechanisms for digital payments to occur. These include a bank account, access to online banking services, a suitable device for initiating payments, and a means of transmission, which may involve registration with a payment provider, bank, or midway service. Digital payment and receipts have some opportunities for instance, lower risk in cash management, the opportunity to fast transactions, easy book-keeping, and tax calculations (Mahedi Hasan, 2023). According to Ashley (2023) there are various types of benefits including digital payments and receipt systems. Digital payments and receipt systems may be convenient and easier for both customers and organizations. Speed up transactions, easier to track and monitor fraud transactions, increase security, and enhance global customer experience.

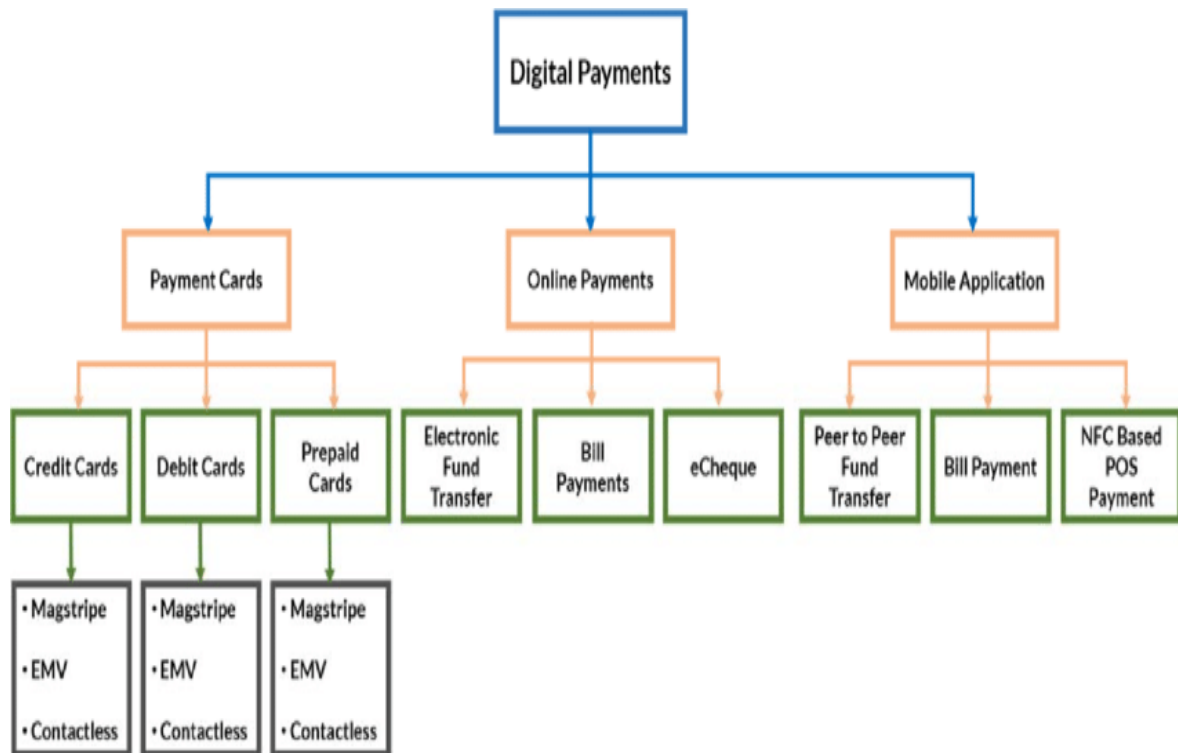


Figure 2. Digital payments (Shirsha, 2017)

Microfinance institutions (MFIs) in Bangladesh have been progressively adopting digital transformation for various financial services, such as loan disbursement, repayment, and savings collection also cashless transactions. bKash, Nagad, or Rockets provide services for the disbursement and repayment of loans digitally. Loan amounts are credited directly to the borrower's mobile wallets. Borrowers can withdraw this money from anywhere digital card or mobile wallet. Mitigating the risk of bearing physical transactions.

Digital payment and invoice systems provide several advantages over traditional methods, including time savings, security, cost reductions, and transparency. It is processed at any time and from any location via cell phones, tablets, or desktops. Digital payments are transferred in real time, which reduces settlement time and improves fund availability. Cryptography, authentication, and fingerprint verification technologies ensure the security of sensitive information. Electronic money transfers eliminate the need for documentation, human reconciliation, and physical infrastructure. Digital solutions also provide transparency in transaction histories, current balances, and financial statement records, making accountability, dependability, and regulatory audits easier.

Microfinance institutions also use mobile, and tablet for loan payment, receipt, and savings collection within the different digital mobile app's web portals, or other channels such as Microfin360 (data soft), Grameen link, etc. The borrower can directly transfer their loan installment to microfinance institutions through digital platforms. As a result, it reduces the cost and time of

organizations and consumers. Both microfinance institutions and customers can facilitate the effective recording of data and reports which is generated electronically with their transactions. Digital platforms enable reporting automatically to record data and analyze loan disbursements, repayments, savings collections & refunds, and new admission and cancelation reports every day, every week, and even every month. This data is valuable for the decision-making of top management (Godfroid, Juliana, & Cecile, 2022).

### 2.2.3 Mobile Banking Solutions

Mobile banking is an internet-based banking service offered by banks to their customers, allowing them to access their accounts and perform various transactions using a mobile device such as a smartphone or tablet connected to the internet. Using a mobile banking application, individuals can conveniently manage their finances on the move without the need to visit a bank in person or use a computer. The service is typically free to use, but users may encounter connectivity issues, and technical glitches, and must follow security protocols (Dipen, 2024).

Mobile banking is a recent addition to the banking industry, enabling banking activities through mobile devices. Given the significant rise in mobile phone usage, banks in developed nations have embraced this service due to its competence and low cost. The prevalent adoption of mobile phones as a primary communication tool suggests that the expansion of mobile banking in Bangladesh is unavoidable, particularly in areas where traditional bank branches are scarce (Saifur Rahman & Mizanur Rahman, 2013).

Mobile banking solutions are very important in Bangladesh's prospects because as a developing country, the large number population living in this country most of the people are low- and middle-income levels. This is an extra hassle to go to the bank for their operations because this is more cost-effective and time-consuming. Mobile banking is the best solution for developing countries. People can access by mobile phone anywhere and anytime which can reduce physical banking lines and cost, and secured transactions. Mobile banking has undoubtedly been an extremely successful financial service initiative in Bangladesh, experiencing noteworthy growth. Looking ahead, however, there are important considerations regarding issues such as safety, trust, and network availability that need attention. While the expansion of the service continues to be impressive, there may come a point when the market becomes overwhelmed (Sadia Noor, Maimuna, & Fahad, 2018).

Mobile banking services in Bangladesh comprise digital financial services which are operated by mobile devices through internet connections. Mobile banking services are very important because

of easily made transactions, money transfers, bill payments, balance inquiries, online shopping, mobile research, and financial inclusions. Mobile banking software at banks enables consumers to execute banking transactions using portable devices, giving financial security and flexibility. This cuts costs and improves operating efficiency while providing financial assurance. Financial institutions provide account balance requests, tokenize offline transactions, transfer funds, pay bills, create transaction notifications, and manage accounts. Financial education gets help from smart banking systems, particularly for those living in the countryside.

Mobile banking enables extensive solutions for wide-ranging financial transactions using mobile devices. It reduces banking queues, and cash transactions, and reduces the risk. Customers can pay and deposit money easily from any location. Microfinance organizations collect loan installments and savings deposits from customers through mobile banking. Top 7 companies leading mobile banking solutions in Bangladesh.

<b>Mobile Banking Service</b>	<b>Offered by</b>	<b>Launch Date</b>	<b>Key Features</b>	<b>Dialing Code</b>
bKash	BRAC Bank	July 2011	Wide range of services, broad user base	*247#
Nagad	Bangladesh Post Office	Nov 11, 2024	Reliable, diverse services, including Cash-In	*167#
Rocket	Dutch Bangla Bank	May 2011	Long-established, rebranded for better usability	*322#
Mcash	Islami Bank BD Ltd	2024	Offers deposit, withdrawal, fund transfer, and more	*259#
SureCash	Rupali Bank Limited	–	Payment services, mobile recharge, government allowances	*495#
Upay	UCBL	–	extensive services focus on financial inclusion	*268#
Trust Axiata Pay (Tap)	Trust Bank Ltd & Axiata	–	Emerging player, partnership with telecom giant	*733# or *201#

Figure 3. Everything is related to financial transactions with microfinance institutions (Shihab, 2023).

#### 2.2.4 Data Analytics and Artificial Intelligence

Data Analytics and Artificial Intelligence have played a pivotal role in data presentation and interpretation. Together, they make big and powerful things such as big data analysis within a second. According to the International Institute of Business Analysis (2023) Artificial Intelligence for data analysis allows large and complete data at maximum speed, very quickly and more accurately, AI can analyze and forecast future things and behaviors.

The impact of the convergence of AI and Data Analytics on organizational data application real-time treating capacities, no traditional boundaries to enable data. Improve customer service and customer satisfaction. According to Quantum Analytics (2023) Keywords like "personalized customer insights" underscore the potential for better customer engagement through this powerful partnership.

Data analytics increases financial inclusion to understand the operational and customer data in the landscape of microfinance institutions. Big data analyses of microfinance institutions opened up prospect's influence to view various digital channels such as mobile data, and social media interaction with borrowers to collect data which enables accurate decisions, understanding of customer behavior, risk assessment, and fraud detection, enlarging financial inclusion, successful operational efficiency and compliance & regulations (Adfinance, 2023).

Microfinance institutions utilize digital data analytics to segment the client base depending on different categories, customers' financial behaviors, demographics, and transaction history. The segmentation can help to decision making in further transactions with the customers. Data analytics improve the customer's interactions and feedback that insights allow customer preferences and needs. It is easier to monitor compliance regulatory requirements, because of analyzing big data to help identify and rectify any inconsistencies that could lead to organizations' compliance matters. Expanding operational efficiency, resource allocation, and process optimization can be possible also segregate financial and operational data and easier to produce reports. On the other hand, Artificial Intelligence helps to get more accurate credit scoring that helps decision-making. Similarly, real-time solutions and fraud detection can be recognized by AI technology which navigates complicated issues easily.

According to Gerard (2023) integrating data analytics and artificial intelligence (AI) into a microfinance organization will be numerous innovations and upgrades, competent, and impactful.

Artificial Intelligence (AI), as well as Microfinance, have been interdisciplinary. Collaborating doesn't necessarily mean that AI has revolutionized credit scoring, risk assessment, automated loan processing, fraud detection, personalized financial advice, data analysis, mobile banking, and chat-based loan applications. The AI can screen the data source, for instance, the devices for instant messages, transactions, and relationships using mobile phones and the internet. It is capable of loan processing automation, thus cutting costs and time for microfinance organizations can be utilized for spotting the doubtful acts of both customers and institutions by offering alerts against fraud moving forward. This means machine learning will help in financial decision-making, budgeting, and financial education. It is additionally good at assessing customers' behavior and being a base for valuable market information. Banking and payment via mobile devices can be carried out through a single online credential, which is the entry point giving clients access to the entire bank system. The borrowers can now apply for loans through AI chat, which otherwise requires the borrowers to be physically present. Implementation of AI in microfinance has brought a significant decrease in cost, time, and services, which have allowed microfinance organizations to cater to clients outside the margin and provide business assessment, process automation, and customer support.

### 2.2.5 Customer Relationship Management and Customer Relation Models

Customer relationship management emerged in 1970 for technological solution companies of the internal sales teams to automate management. Customer relationship management (CRM) stands out as a contemporary tool for efficient management of customer-centric information channels and methods, often used alongside Enterprise Resource Planning solutions. The main objective is to enhance organizational performance, ultimately enabling companies to attain superior business outcomes. The pivotal role of customers in driving business success emphasizes the need for effective tools to gather management information. To meet customer needs and expectations, companies must align productive, logistic, and commercial efforts accordingly. This poses a challenge for entrepreneurial businesses, making tools and technological solutions crucial, especially in customer management and entrepreneurial marketing.

Customer Relationship Marketing (CRM) is highlighted as a key player in this domain, demonstrating its significant impact in navigating the complexities of customer-centric strategies and fostering business development (Gurela, Gomez, Badenes, Raul, & Pedro, 2022). In the microfinance organization Customer Relationship Marketing (CRM) plays a crucial role in interacting with customers and managing systems. Onebox (2020) states that increases sales, and

services, collects, and analyzes data by CRM as well as automatically possible to payment, processing requests, and consumer contact.

Customer relationship management (CRM) highlights the role of information technology in inventing, maintaining, and improving customer relationships. It acknowledges that while CRM proposes considerable advantages, it is not without challenges. The key takeaway is that businesses must clearly understand CRM and how it can tactically influence it to succeed. The focus is on using CRM as a tool for business ascension, emphasizing the idea that a well-implemented CRM strategy can contribute significantly to a company's success (Akpan, 2023).

According to the deputy CEO of Pally Bikash Kendra Khaleda (2023) Customer relationship management is very essential for microfinance institutions in Bangladesh. Some key aspects are related to the customer relationship in the framework for the digital transformation of microfinance institutions. Digital microfinance institutions (MFIs) gather and analyze data from the customer to meet their preferences and behavior. Data collection through different digital tools, for instance, social media, websites, and mobile apps. The microfinance organizations in Bangladesh use automation to maintain customer relationship management, for example, loan procedure, approval, and disbursement. Automation helps employees reduce workload and instant feedback to customers' examinations. Digital tools offer microfinance institutions digital communication channels where customers can get quicker assistance with chatbots and virtual assistance. The organization and customers benefit from integrating customer relationship



Figure 4. Customer experience (Fassin, 2021)

Peppers and Rogers created the IDIC paradigm, which has four stages: comprehension, interaction, distinctiveness, and personalization. Organizations can use a strategic plan addressing these four key components—technology, education, collaboration, and communication—to improve international business culture. The use of personal data like name, address, and purchase history guarantees that businesses are aware of their customers' requirements, desires, and purchasing habits. The core of the QCI approach is gaining, retaining, and ingraining consumers through goal-oriented attainment, proactive goal setting, and attention to the customers' external environment. The granular areas—analysis and planning, proposal, information technology, people and organization, process management, customer service, impact measurement, and experience—are among its eight constituent parts.

The cycle of actions that are customer-centered and involved in creating enduring relationships with customers is described by Payne's Five Process model. It attempts to handle both problems at once by combining the company's and the customer's strategies. CRM viability, which includes resource allocation to change management and project management, is essential for an effective



release. Employees need to adopt the new customer-centric culture and follow the policies and procedures of the company. The competitive advantage between corporate and customer initiatives is measured through performance evaluation. Database development is a component of data management, as is the process of gathering, analyzing, and incorporating data-study insights.

Project management, resource management, change management, and CRM preparedness are the four pillars that organizations must integrate to adopt the Five-Process CRM model. Flexible CRM workflows are made possible by change management, while personnel management assists in both customer assignment and organizational staff structure (Riley, 2022).

### 2.3 Impact of digital transformation on microfinance operations

Digital transformation has substantially changed microfinance operations, allowing for inclusive banking, and reaching out to underserved populations. Digital platforms have created opportunities for microfinance institutions to reach places previously inaccessible to traditional operations. Mobile and Internet banking have enabled microfinance organizations to collect customers, provide financial education, and deliver more efficient services. Digital transformation has also streamlined process flow, resulting in cost savings and enhanced performance. Automating loan applications, underwriting, and disbursement has accelerated the process beyond human resources. Digital channels result in paperless transactions, which reduce administrative costs and physical platforms, thus lowering overall costs for MFIs and customers.

Data analytics and machine learning algorithms have dramatically enhanced risk management, lowering the risk of fraud and identity theft. Digital security technologies provide real-time loan monitoring and identification authentication. This method has resulted in improved financial inclusion for excluded areas by providing services such as mobile banking, digital savings accounts, and micro-insurance products. Clients can optimize financial resources, save for the future, and plan for any dangers. Personal connection and feedback are also encouraged by digital platforms, allowing banks to better understand the needs of low-income customers. This results in greater client happiness and product awareness, making the digitalization of financial services a huge success.

The microfinance sector has been significantly accelerated by technology, enabling FinTech startups to create synergies and develop peer-to-peer lending platforms, digital credit assessment algorithms, and distributed payment systems using blockchain technology. However, digitalization also presents challenges like security breaches, data privacy concerns, and potential disadvantages

for the disadvantaged. Despite these risks, digital oversight offers opportunities for financial services, accessibility, efficiency, and financial inclusion. MFIs should strategically address these weaknesses to make the operations more social and sustainable.

### 2.3.1 Enhanced Outreach and Financial Inclusion

According to the Asia-Pacific Economic Cooperation (2009), microfinance grants the ability to enhance financial inclusion by considering the economic needs at the base of the pyramid with the resources of the financial sector. This can lead to the development of capital markets, the widening of economic growth, and profitable business areas established. Digital transformation of microfinance diminishes the transaction costs, and active delivery of services by mobile technology, smart cards, and biometrics. In Addition, expanded the loan services, and loyalty agents, by the spectrum of service providers. Result in developing economies is at the forefront of finding microfinance solutions.

According to Ahmad (2019) Financial inclusion refers to providing banking services and credit affordably to a wide range of disadvantaged and low-income groups. This includes offering various financial services, for example, savings, loans, insurance, payment options, remittance facilities, and financial guidance through the formal financial system.

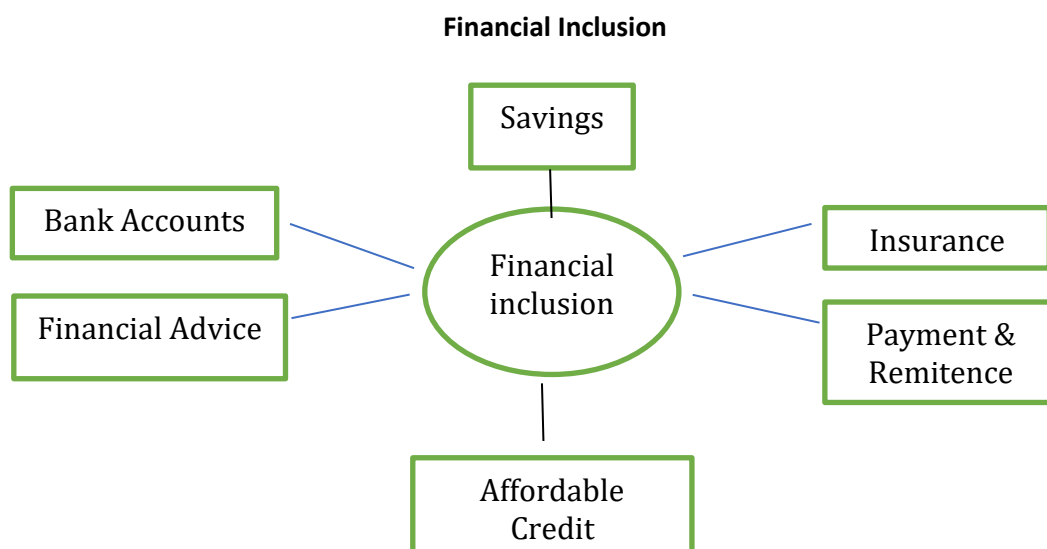


Figure 5. Financial Inclusion

### 2.3.2 Operation Efficiency and Cost Reduction

According to Wavetec (2024) reduction the operational efficiency and cost reduction is an intelligent strategy to enhance the overall efficiency of the business. Upgrading the business strategy is the best way of cost reduction. This is very challenging in today's competitive landscape. Some of the best ways of boosting overall business success and financial stability improving processes & procedures, integrating technology, managing vendors, optimizing the workforce, implementing tactics to reduce waiting times, and enabling self-service transactions.

Microfinance institutions can release stress in different ways, including income generated from loan disbursements and reducing costs. An array of recent developments has prompted heightened attention to financial sustainability and efficiency within the microfinance sector. These include growing competition among MFIs, the commercialization of microfinance, technological advancements now accessible to utilized microfinance, and government policies on financial liberalization and regulation (Niels, Robert, & Aljar, 2011).

Enhancing operational efficiency and cutting costs for microfinance institutions (MFIs) offers numerous significant advantages. By optimizing processes and reducing unnecessary expenditures, these institutions can ensure long-term profitability and stability. Reducing costs can result in decreased interest rates and fees for microfinance customers, thereby improving the accessibility of financial services for low-income individuals and small enterprises. Effective operations lay a strong groundwork for expansion and scalability. Cost reduction increases competitive advantage in the global market. Enhancing customer experience, risk management, and long-term viability.

### 2.3.3 Improve risk management.

Enhancing risk management practices is essential for microfinance institutions to address potential risks and maintain long-term viability.

Microfinance institutions have many common risks, like credit risk, liquidity risk, operational risk, financial risk, pricing risk, legal risk, and strategic risk. Microfinance institutions have created appropriate risk management methodologies to reduce strategic, operational, and financial risk. The most effective risk management methods are selecting and judging the clients, keen monitoring, choosing competent guarantors, interpreting portfolio reports, and loan loss reserves, and identifying outlines (Dirk, 2000). This enables lending decisions and reduces default likelihood. Overall, portfolio ratio and elaborate effective procedures to supervise loan operation and apply regular reporting procedures.

Enhancing the staff's understanding of risk management principals' microfinance institutions to take training initiatives for the staff, for, risk relief strategies, credit analysis, understanding customers' behavior, and screening customers. Understanding technological solutions, loan processes, assessment, approval, disbursement, and monitoring processes. Learning to handle liquidity and capital is essential for institutional strength. Conducting and evaluating internal and external audit reviews, ensuring rolling modification and risk management context.

Periodically review the efficiency and effectiveness of each step in the risk management process cycle, including identification, assessment, analysis, planning response, communication, and monitoring. For instance, employing Risk and Control Self-Assessment (RCSA) for risk identification ensures it is updated as conditions evolve, or new risks emerge. Consider leveraging a Project or Program Management Office to embed risk management into standard operational procedures, making it a routine part of enterprise operations. Initiate tracking of risk treatment progress against plans to establish measurable metrics. Evaluate risk activities to ensure the focus is on the most critical assets and services. Start with high-value assets supporting critical business lines, processes, or products, then expand as the risk management capability evolves.



Figure 6. Risk management process (Tucci, 2023)

According to Lisa (2019) Integrate the planning of risk management activities with audit and compliance cycles to streamline data collection and optimize resource usage. For risk management reliant on quantitative models, subject these models to the risk management process regularly to verify continue to perform as intended. Retaining risks within acceptable broadmindedness and keenness can effective risk management contain developing decision-making, allying resources to address high-impact risks, and creating value.

Risk management could impact an organization that has designed an approach to identifying, evaluating, and alleviating potential threats or uncertainties. This process results in making plans to lessen negative results, estimating the efficiency, and measuring the probability and consequences of risks. Risk management safeguards an organization's goodwill, diminishing financial defects. This is very important for an organization of decision-making structure that fosters innovation and expansion of an organization (Gibson, 2023). Microfinance institutions have many common risks, like credit risk, liquidity risk, operational risk, financial risk, pricing risk, legal risk, and strategic risk. Microfinance institutions have created appropriate risk management methodologies to reduce strategic, operational, and financial risk. The most effective risk management methods are selecting and judging the clients, keen monitoring, choosing competent guarantors, interpreting portfolio reports, and loan loss reserves, and identifying outlines (Dirk, 2000). This enables lending decisions and reduces default likelihood. Overall portfolio ratio and elaborate effective procedures to supervise loan operation and apply regular reporting procedures (Dirk, 2000). Enhancing the staff's understanding of risk management principals' microfinance institutions to take training initiatives for the staff, risk relief strategies, credit analysis, understanding customers' behavior, and screening customers. Understanding technological solutions, loan processes, assessment, approval, disbursement, and monitoring processes. Learning to handle liquidity and capital is essential for institutional strength. Conducting and evaluating internal and external audit reviews, ensuring rolling modification and risk management context.

#### 2.3.4 Customer-Centric Approaches

According to Ada (n.d.), the customer-centric approach meets the customer's desire and requirements and makes value with products and services. There are very good practices formalized for social performance management. Customer-centric approaches impact on microfinance sectors. For example, BRAC International is a Bangladeshi organization working in multi-nationally. Especially work in Africa and South Asia. In developing countries growing and impact the strategy mainly focuses on customer-centric approaches. The customer-centric

approach impacts the significance of client-centric, gender-smart microfinance for encouraging poverty, to developing well-being and residence, even during emergencies, especially for women. It highlights the practicality of the strategic decision-making process of customer speeches. Aligning management and investment decisions with client impact ensures financial sustainability and expands the positive influence on clients' lives (Upoma, 2021).

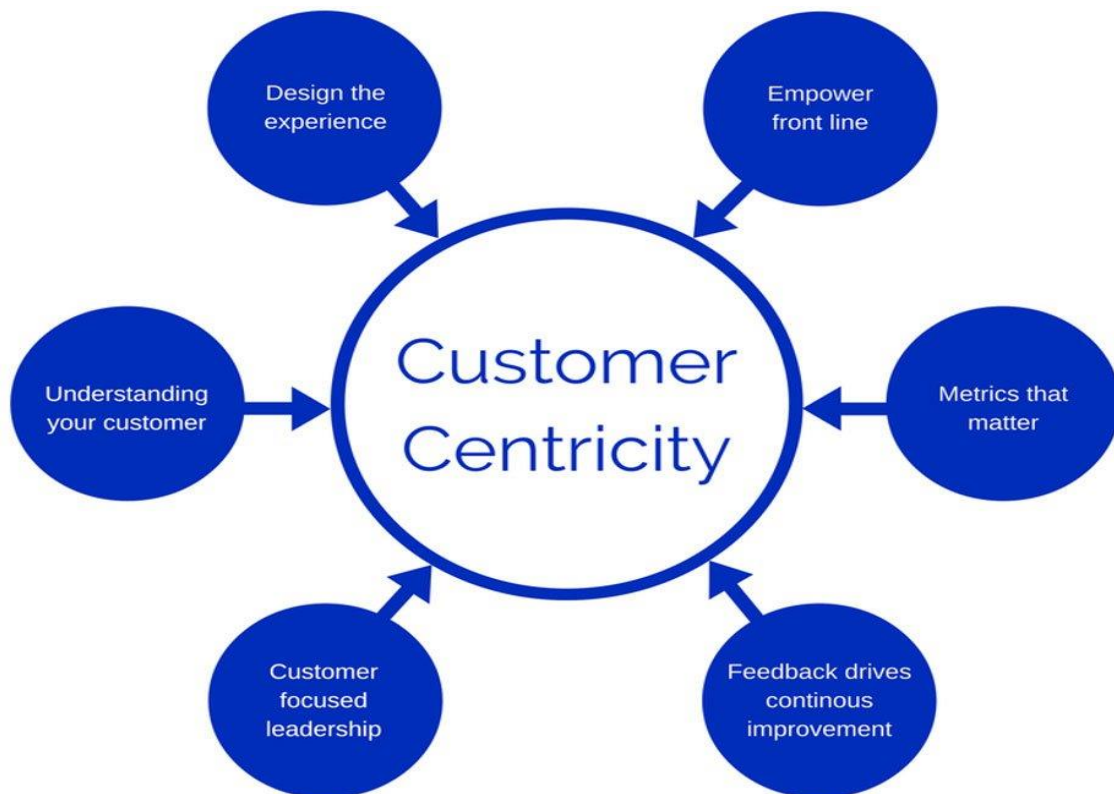


Figure 7. Customer-Centric Approach process (Rajan, 2022)

According to Team Qualtrics (n.d.) Customer centricity is not only for the benefit of customers but also for customer-centric organizations by making loyal customers. Way of implementing customer-centric strategy, survey feedback, transaction history, frontline feedback, website analytics, social media, third-party reviews, brand marketing, text messaging, and email. There are some actions suggested to implement customer-centric approaches, encouraging clients to become marketers, understand customers' needs, thinking client-centric. As a result, a customer-centric approach will assist businesses or organizations with future decisions.

### 2.3.5 Regulatory Compliance

According to Microfinance Regulatory Authority (n.d.) The Microcredit Regulatory Authority (MRA) was founded under the Microcredit Regulatory Authority Act of 2006 to oversee microfinance organizations in Bangladesh. Before initiating microfinance operations, MFIs must secure licenses

from the MRA. This involves satisfying specified criteria, including capital adequacy, governance standards, and operational capabilities. The MRA imposes limits on the interest rates MFIs can levy on borrowers to prevent exploitation and ensure affordability, mandates standards concerning loan portfolio quality, liquidity management, and risk management practices, sets guidelines for governance and management practices within MFIs, encompassing board composition, management expertise, and internal controls.

According to Anwar (2008) MFIs are obliged to disclose financial performance and operational activities according to stipulations laid down by the MRA. The MRA ensures fair treatment of clients, transparent pricing, and disclosure of terms and conditions to borrowers for consumer protection. Regular supervision and monitoring by the MRA ensure compliance with regulations help identify potential risks in the microfinance sector and offer capacity-building support and training programs to enhance the skills and knowledge of microfinance practitioners.

According to Rouse (2023) Regulatory compliance in ICT refers to the adherence of organizations to laws and legal regulations pertinent to the operations. It imposes that technology products, services, and processes meet prescribed standards established by regulatory bodies. Failure to comply with regulatory requirements can result in substantial fines, legal action, and damage to the organization's reputation. Consequently, benefits included regulatory compliance, for instance, ensuring monitoring, maintaining, and developing training material, identifying the potential risks, performing internal auditing, and up-to-date information.

### 2.3.6 Socio-Economic Factors

Microfinance institutions have a considerable impact on socio-economic factors in Bangladesh, notably in reducing poverty, empowering women, generating employment, enhancing access to essential services, fostering entrepreneurship, promoting financial inclusion, facilitating community development, and bolstering resilience against shocks. MFIs also played an important role in sustainable development goals by financial inclusion. In Bangladesh, almost 43 percent of families have access to microfinance financial services. In the future microfinance organizations impact the economy by developing and growing investment in micro and small enterprises.

Bangladesh suffers from severe poverty and financial exclusion as a result of the rural sector's lack of access to formal financial services. However, the country may learn from and apply digital financial services to strengthen its economy. Microcredit services have been widely adopted by marginalized communities, including smallholder farmers and rural craft craftsmen, to provide effective business opportunities. Microfinance is critical for women's empowerment since it

facilitates loans, savings, and financial literacy while also developing self-confidence, leadership, and entrepreneurial abilities. It also has advantages for agricultural dependency, as small-scale farmers sometimes struggle to obtain lease finance and inputs. Microfinance also serves as a safety net in disaster-prone regions, offering emergency loans, insurance, and disaster preparedness training. The government's primary purpose is to encourage microfinance initiatives and implement rules that protect individual customers and ensure financial stability.

According to Selim, Osmani, & Baqui (2017) The microfinance organization in Bangladesh's impact on social and economic development through different channels 8.9% and 11.9% GDP added from microfinance to the country's total economic DGP estimates the research which depends on the working labor market. Higher between 12.6% and 16.6% contribution to the rural GDP. Bangladesh, once among the world's poorest nations with nearly half of its population living below the poverty line, prioritized poverty reduction and rural employment generation. To address these challenges, the government of Bangladesh embarked on a comprehensive approach emphasizing economic self-sufficiency, macroeconomic stability, and support for microfinance institutions (MFIs). Hence, this strategic focus led to the widespread proliferation of MFIs throughout the country, significantly contributing to poverty alleviation efforts and the expansion of the economy (Global Journal, 2021).

#### 2.4 Challenges and Barriers to Digital Transformation.

The utilization of digital platforms inspires Microfinance Institutions (MFIs) in Bangladesh to provide to the unbanked demographic, encourage financial inclusion, and play a role in reducing poverty more effectively. Nevertheless, it is crucial for MFIs to method the digital realm carefully, undertaking issues like digital literacy, safeguarding data confidentiality, and certifying cybersecurity.

The digital transformation of microfinance with customers has challenges and risks for microfinance institutions. A key challenge for institutions is to find ways to increase client relationships for outreach and to achieve sustainability. In the microfinance sector use of technology and ICTs, for instance, Tablets and mobile phones, globally, there are boundless opportunities for microfinance institutions also increase output and customer service by delivering convenient, reasonable, and strong financial services.

One of the significant challenges of digital technology in microfinance institutions is that the clients may be unwilling to change and accept new technologies. For example, in the Dominican Republic,



in Banco ADEMI some customers lack trust in using ATMs because machines would not deliver them accurate amounts of money. Similarly, research in Peru, Guatemala, Ghana, China, and India lack trust in new technologies as the aim for the reluctance of implementation, especially in cases where human collaboration is limited (Pena, Amie, & Beatriz, 2016).

According to the World Bank (2017) a digital transformation in the financial service industry with non-bank institutions facing challenges and barriers for customers and offices, including emerging market economy, and digital substitute traditional banks. Challenges for Banks and Fintech institutions in the digital market. Low levels of formal financial services: the challenges are informal credit and savings, and cash control transactions. Lower Income levels: The challenges of banks and non-finance institutions are lower fees, low-price transactions, and the need for user education. Underdeveloped technology and Venture Capital ecosystem: The main challenges are the small technology market, limited income ability, lack of skilled tech/finance entrepreneurs relatively weak infrastructure: immature payment systems, client credit data, and internet coverage.

#### **2.4.1 Data security and privacy**

Digital microfinance institutions raise concerns about data privacy and security of clients' data protection. Ensuring data protection is a significant belief among users. Data privacy is a big challenge in the digital transformation of microfinance institutions. Unauthorized access and misuse of technology increase the risk of data security and privacy. To address these encounters, microfinance organizations enhance staff training and stimulate awareness about data privacy. Despite this, software companies are working progressively to give data privacy to microfinance institutions.

The data security, trustworthiness, and privacy in today's digital landscape are driven by advancements in technology such as sensors, IoT devices, and cloud systems. The stretch of capturing, processing, and sharing vast amounts of data presents significant challenges, including hypothetical privacy cracks and trust issues (Bertino, 2016).

#### **2.4.2 Technological Barriers**

Digital microfinance faces challenges and technological barriers such as, remote areas facing hurdles in accessing fundamental technological resources like smartphones, internet connectivity, or electricity, hindering engagement with digital financial services. Microfinance clients often lack adequate digital literacy to navigate mobile apps or online platforms, grasp financial products, and conduct transactions securely. Certain regions suffer from inadequate or defective

telecommunications infrastructure, resulting in poor network coverage, slow internet speeds, and frequent service disruptions, compromising the reliability and accessibility of digital financial services. Besides this, facing complex and obstructive regulatory frameworks presents barriers to developing and implementing digital financial services, restrictive innovation, and investment in the sector.

According to William & Melissa (2022) Technological barriers to interaction between people block successful and continuous use of technology. In that case, barriers arise in connectivity issues, technology access, and data interpretation.

### 2.4.3 Costs of implementation

The expenses associated with establishing microfinance institutions (MFIs) in Bangladesh can fluctuate based on several factors, including the scope of operations, geographical reach, regulatory obligations, technological infrastructure, personnel remuneration, and additional operational costs. The general costs component is related to implementing the digital transformation of microfinance institutions in Bangladesh. Incorporating technological solutions to optimize operations, such as software for loan management, accounting, and client management systems, may encompass expenses for hardware essentials like computers, servers, and internet connectivity. Salaries and benefits are included for hiring new staff to implement technological solutions. Risk management costs, monitoring and evaluation costs of digital devices and technologies, and miscellaneous costs are related.

Implementation costs encompass expenses associated with developing and executing a strategy aimed at implementing one or more evidence-based interventions. This strategy directly influences subsequent interventions, potentially impacting their efficiency, utilization, or quality (Gold, McDermott, Hoomans, & Wagner, 2022). Project cost estimation involves considering direct costs, indirect costs, and various other expenses associated with the project, ultimately devising a budget that aligns with the financial requirements essential for achieving project success. There are some costs related to the project, for example direct, indirect, fixed, variable, and sunk costs. The cost estimating technique assists the project in developing accurate, analogous, parametric, bottom-up, three-point, reserve analysis, cost of quality, and dynamic project costing tools. Implementation costs encompass expenses associated with developing and executing a strategy aimed at implementing one or more evidence-based interventions. Thus, the strategy directly influences subsequent interventions, potentially impacting their efficiency, utilization, or quality (Brenna, 2023).

#### 2.4.4 Client resistance

Client resistance in microfinance denotes the hesitancy or opposition of borrowers or potential borrowers towards the offerings and policies of microfinance institutions (MFIs). This resistance can take numerous structures and may have multiple inherent reasons. A universal method is important in microfinance organizations to efficiently address client resistance that is required for clients. This approach provides financial services, education, and literacy as well as trust and ethical practices. Moreover, ensures the development of the client's viewpoints. consequently, encouraging major engagement and impact, and reducing resistance.

In developing countries, microfinance has emerging rules for combating poverty. Lower-income people get support from micro-savings and micro-insurance that contribute to mitigating risks, enhancing skills, boosting productivity, and enhancing overall quality of life. This is very important for clients to tackle systematic obstacles (Joao, Fabio, & Ana, 2022).

Microfinance organizations can bolster self-empowerment by providing quality education, producing new entrepreneurs, and self-empowerment to alleviate poverty (Jeremiah, 2020). Digital microfinance has transformed strategy for clients of conventional challenges. Its influence on client resistance can be substantial: bitcoin and cryptocurrencies, and private blockchain-like ledger technology. In digital microfinance, it is possible to electronic money transfer (Robarto, 2021).

#### 2.4.5 Case Studies

Successful case studies describe some challenges faced and lessons learned from the case studies. I have practical work experience in the digital microfinance sectors in Pally Bikash Kendra which is related to the studies that I have explained in the case studies here.

Pally Bikash Kendra (PBK) is a non-governmental organization operated in Bangladesh from 1989 to now. The primary objective of PBK is to grow the socio-economic situation of rural communities, particularly focusing on women and children empowering. Aim to equip these marginalized groups with the skills and resources needed to take charge of their lives. PBK gives all opportunities to the clients over their resource's independence and self-sufficiency. Pally Bikash Kendra continues their services in Bangladesh in 35 districts, with 265 branches. They offered their customers microfinance along with health, education, sanitation, and solar power services to their customers (McCombes, 2019).

Due to manual processes, PBK has faced numerous challenges since 2015, which has led to inefficiencies and increased prices and time required to execute activities. PBK has decided to implement technology and digital techniques to streamline its services after realizing the need for change and contact Data Soft. Data Soft is primarily known as a software development company, PBK seeks to adopt these solutions to Data Soft's for smoother operations. They offer IT-related services, including cybersecurity solutions, data analytics, software development, and IT consultancy services. Data Soft and PBK established a connection in February 2015. Though there were huge obstacles to overcome beginning, PBK implemented the digital strategy smoothly through Data Soft for several measures. According to Hassan (2024) Identify and assess the requirements to set digital technology in the organizations including operational plans and put in the comprehensive working schedule, plan, goal, and other resources for organizations.

Data Soft customized microfinance360 software to match the specific requirements of the institution and offering microfinance institutions. Customized loan management systems, accounting information systems, client management systems, Human resource management systems, and all other required solutions have been installed with the microfinance operational regulations. Data soft also offered infrastructure to Pally Bikash Kendra such as Computers, servers, and smooth internet connection. Implementing the new software and digital services PBK conducted training sessions for all employees to smoothly use microfin360 software. As a result, enhance staff knowledge and skills that increase productivity and services.

#### **2.4.6 Successful Digital Transformation Initiatives**

According to Nathan, Shipilov, Didier, & Antoine (2022) a successful digital transformation requires four things IT uplift, digital operations, digital marketing, and new venture.

The effective utilization of digital technologies to revolutionize processes, operations, and business models is involved in a successful digital transformation strategy resulting in efficiency, innovation, and competitiveness.

**Get Up and Integration:** The microfinance institution implemented software and IT services across different departments or branches and monitored the integration process closely, ensuring support and assistance as needed. PBK has ensured all kinds of support for the implemented software.

**Ongoing Support and Maintenance:** Establish the mechanism for providing technical support, software updates, and upgrades, and ensuring regulatory requirements. As a result, PBK hired a special IT team for technical support and maintenance.

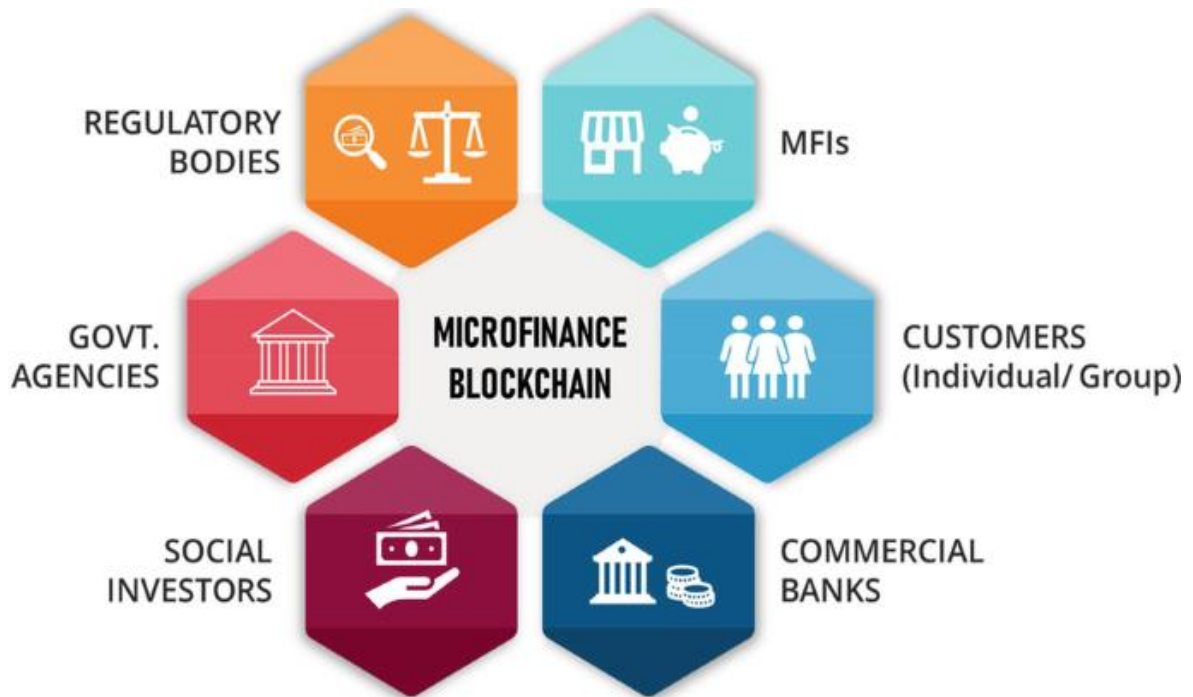


Figure 8. Microfinance blockchain (Anirban, Shiladitya, Nandy, Shifa, & Piyush, 2021)

Evaluation and Optimization: DataSoft regularly evaluates the performance and effectiveness of software and IT services within the microfinance institution. Gather feedback from users and stakeholders to identify areas for improvement and optimization and work collaboratively with Data Soft to implement enhancements as needed.

Therefore, by maintaining a collaborative approach with DataSoft, microfinance institutions successfully implemented their software and IT services to streamline operations and achieve organizational objectives.

### 3 Research Methodology

Research methodology is not just about grabbing some data but utilizing proper tools to validate and understand it as well. The research will be conducted using a qualitative research approach as the strategic method. To conduct a quantitative research study, the survey approach will be adopted so that it can probe into the deep and specific knowledge that Bombardment has entailed concerning grounded theory. Also, practical work knowledge will form a part of the competency investigation. It will be conducted among the company staff members (Malek, Monirul, & Abdul, 2017).

#### 3.1 Research Design

This study employs a research design for the digital transformation of microfinance institutions in Bangladesh. The quantitative approaches enable the collection through the descriptive-analytical methodologies used for the implementation of unstructured surveys. The primary objective of this research is to assess the impact of digital transformation in microfinance sectors, as they increase financial inclusion. Additionally, avoiding risk and fraud prevention, and integration with formal financial systems. Consequently, easily analyze big data and sustainable growth and impact. Secondary data sources additionally acquire data from the survey of 15 questions. The research design has been clearly defined, and the implementation phase of the project is underway. Conceptual technical design by teamwork by team members doing the fieldwork and data analysis (Kampen, Tobi, & Jari, 2017). According to Warren, Jansen, & Kerryn (2020) Research design relates to the comprehensive strategy that will be employed in the study. This encompasses decisions such as whether to utilize an experimental design connecting the manipulation of one variable while keeping control over others.

#### 3.2 Data Collection Methods

The data collection method is the systematic process of collecting data in different ways such as surveys, and practical work experience. Data has been collected online by surveying questions in Google form with colleagues, and customers of microfinance organizations and providing answers to the research questions (Harvard Business School, 2021). Though data is collected in the Google Form database. Also, more than 8 years of practical work experience in different roles in the microfinance sector in Bangladesh, utilizing professional knowledge in the research. As well as a professional network and organizational resources to connect key informants from the selected

organizations. Besides, help from people or organizations to the participant list who has provided their practical work knowledge.

Selected institutions to approach with a formal email invitation, messaging, and calls to the knowing individuals, especially to the Pally Bikash Kenra were worked practically with a broad explanation of the research purpose, working plans, and questionnaire to give them possible ideas of digitalization of microfinance, hearing about their opinions. All the participants provide their opinions in that survey questionnaire (Schwab & Pierre, 2022).

A total number of 10 microfinance institutions, one research institution, one government institution, and one software company's employees and general customers of microfinance organizations confirmed their participation (MIS Department of MFI, 2023).

### 3.3 Data Analysis Techniques

According to Karin (2023) data analysis involves refining, transforming, and manipulating raw data to derive meaningful, actionable insights. This process empowers businesses to make well-informed decisions based on relevant information. There are different techniques used for data analysis and clearly defined objectives of data analysis. Cleaning data ensures quality and reliability, understanding the data characteristics, and calculating descriptive statistics. Visualize the data using different graphs, charts, and plots.

As stated by the Australia Bureau of Statistics (n.d.) Quantitative Data using numeric order together added, and the frequency of an observation may be counted. As a result, Qualitative Data enables the calculation of all descriptive statistics. Inferential statistics, relying on numerical value symbols or number codes, do not apply to qualitative data due to their non-numeric nature. In this research, quantitative and qualitative data analysis techniques have been used.

### 3.4 Ethical Considerations

As stated by the UK Statistics Authority (2022) Ethical considerations in quantitative research approaches encompass aspects such as confidentiality, privacy, and concerns about the reproducibility and quality of research. When engaging in qualitative research, it becomes crucial to be mindful of potential ethical issues, especially given the subjective nature of data interpretation and conclusions. This subjectivity can pose challenges in maintaining the reproducibility of the data. Ethical principles are related to the public good, confidentiality, data safety, techniques and quality, legal compliance, public views and engagement, and transparency.

Research in human subjects is administered by a set of ethical principles that order the design and conduct of studies. Scientists and researchers are grateful to follow a specific code of conduct when assembling data from individuals.

According to Pritha (2021) The objectives of human research typically incorporate gaining insights into real-world phenomena, exploring active actions, examining behaviors, and contributing to the advancement of lives in various ways. The ethical considerations in research rotate around the choices made in influencing the research focus and the methods employed in its execution. In qualitative studies, very important is self-reflexivity, thinking demography, and experiences manipulating different phases of research are very important. Studying and work experience in microfinance institutions in my country Bangladesh, I gain certain circumstantial advantages. Choice of the approach, analysis, and reflection which is formed and obstructed on the thinking from studying and previous experience. I used my knowledge to take information from respondents to contribute to digitalized and develop the microfinance sectors (Aquib Sadman, 2021).

When it involves fieldwork, ethical consideration is very significant in social research. This is because when sharing personal work experience, and survey questions to respondents for sharing their personal lives confidential information, which exposes them to certain risks. Particularly, it raises the respondent's confidential information shared with the public places and sphere raises ethical considerations.



## 4 Results and findings

Results and findings are the results of research, experiments, surveys, or investigations that provide real evidence and insights into research concerns. They are presented systematically, sometimes with tables, graphs, and figures. To ensure validity and trustworthiness, scientific research is rigorously reviewed by peers. Transparency in reporting enables other researchers to reproduce tests or findings. Results and findings also influence decision-making processes in domains such as business, policy, and healthcare, allowing organizations to make more informed decisions and address difficulties more effectively.

### 4.1 Demography

Demographic surveys can be conducted in person, over the phone, or online to gather specific population information and provide detailed responses. Demographic analysis is used to collect and analyze data on the common characteristics of specific groups. I recruited a total of 20 respondents from various age groups and genders to take this poll. The respondents were selected based on their experience in microfinance and my supervisor helped me to contact them through Zoom meeting. Also, I have created 15 short questions focusing on the thesis topic. The survey was done throughout the winter of 2024, from April 17 to 19. These survey questions were included in the Google Form and the link was sent to the respondents for their valuable opinions.

The accompanying figure shows that, of the 20 responders, men make up the majority, or over 75% of the total, and women make up more than 25%.

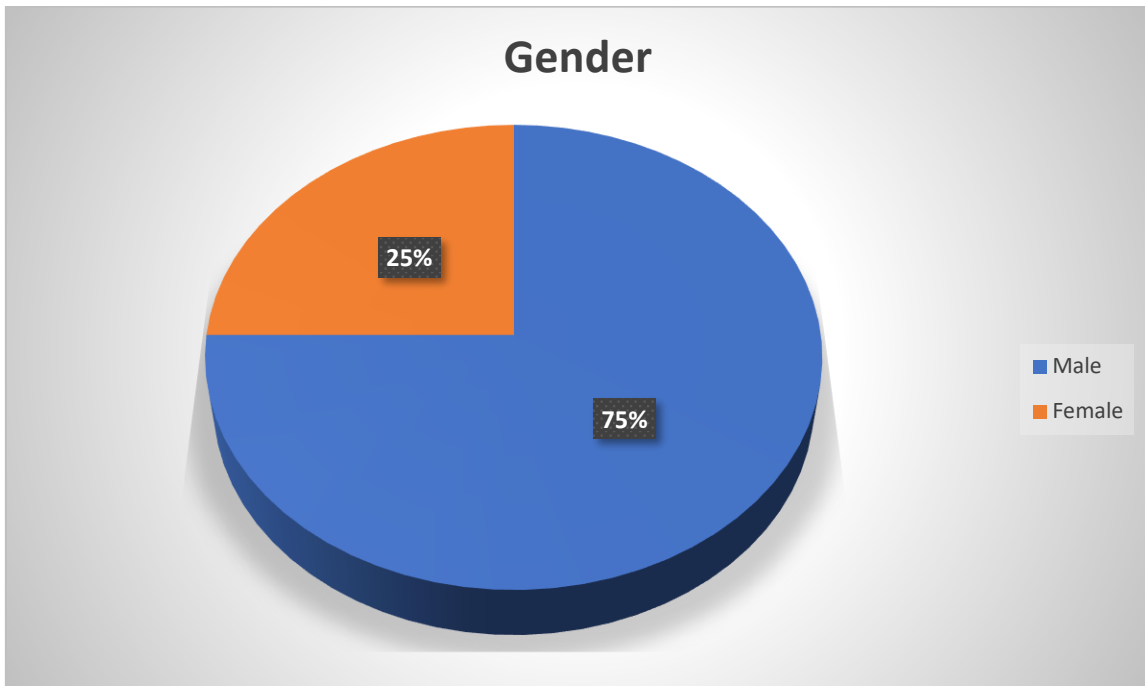


Figure 9. Gender

The ages of the participants were the subject of the following details in the demographic section. Twenty percent of the participants are in the 18–25 age range. Once more, the ages of 55% of them fall between 26 and 35, and the remaining 25% fall between 35 and 40. The results unequivocally demonstrate that young people between the ages of 26 and 35 make up the bulk of the study's participants.

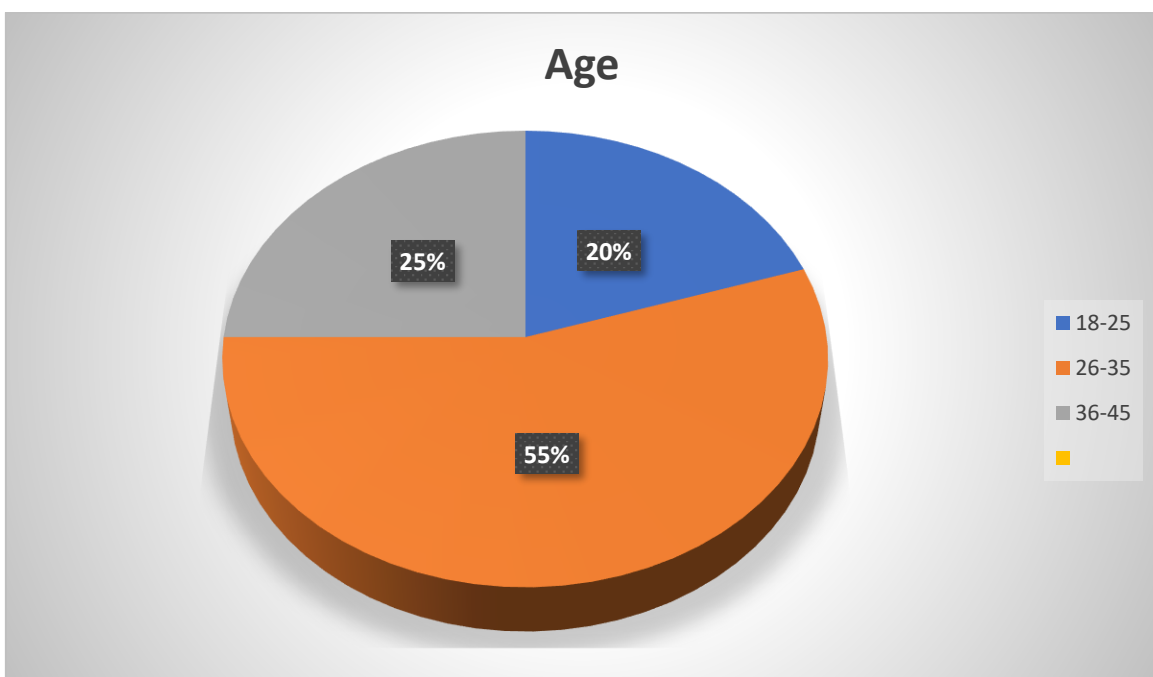


Figure 10. Age

#### 4.1.1 Section One: Technological Adoption Assessing

The actual question on a scale of one to five, evaluates the criticality of the following, for Bangladesh's microfinance institutions when assessing technological adoption. The following bar graph 11 results show the condition of microfinance industries in Bangladesh and the public response to its critical evaluation relating to technical adoption. Here, the public response has been labeled from 1 to 5, and 40% have found technical adoption crucial for further development in the microfinance industry. 25% of people have found it a must, while 25% didn't give much importance to the issue but are okay if it is adopted. Here, most respondents considered critical technological adoption assessing.

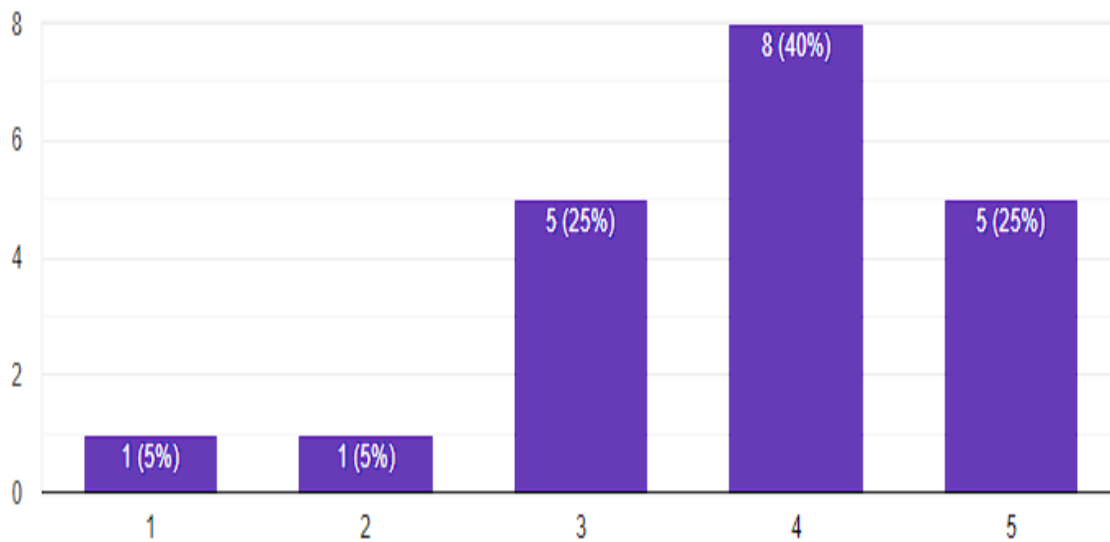


Figure 11. Criticality in assessing technological adoption.

Another question in Figure 12, results show regarding the successful adoption of digitalization in microfinance, 35% of the public thought it to be a subject of most importance for future goals. Again, 25% of people favored the idea of the adoption of digital transformation, though the rest of the population was not pressured about the issue or its implementation.

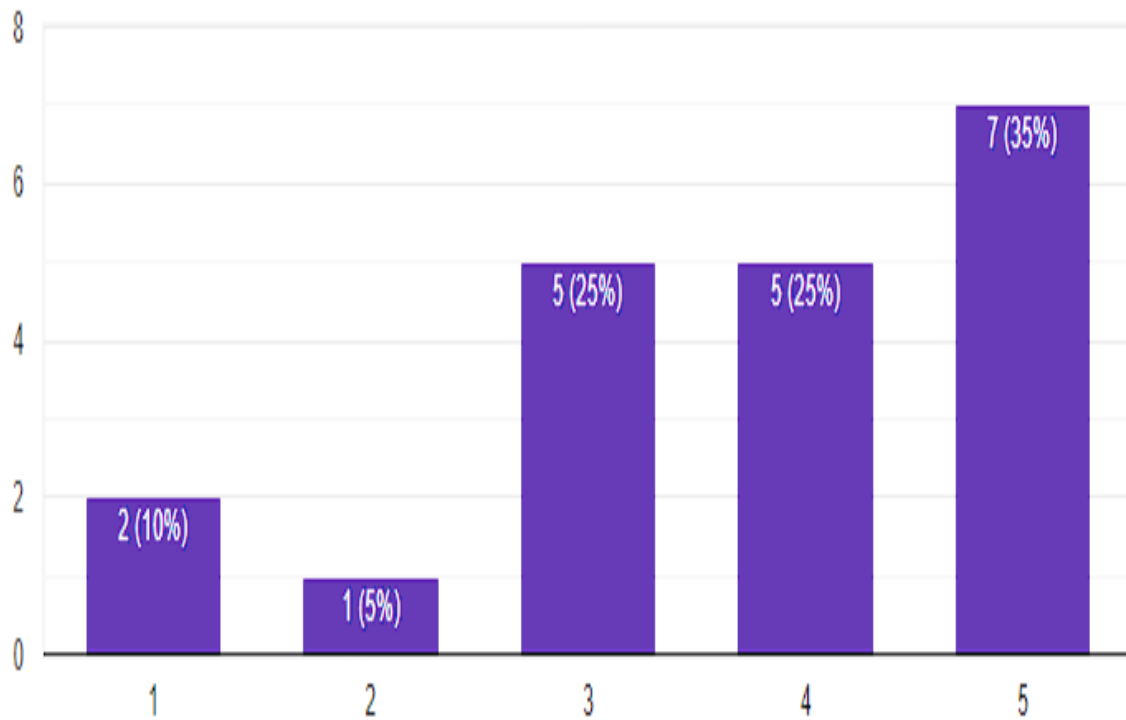


Figure 12. Successful adoption of digital transformation in microfinance

In Figure 13, the results show questions of the following analysis measures how surveys and questionnaires are often used to evaluate digital technological adoption in microfinance institutions. 50% of people have favored the idea, though they sometimes use other methods, and 30% have liked the evaluation while using other methods. The lowest percentage of people dislike the evaluation method.

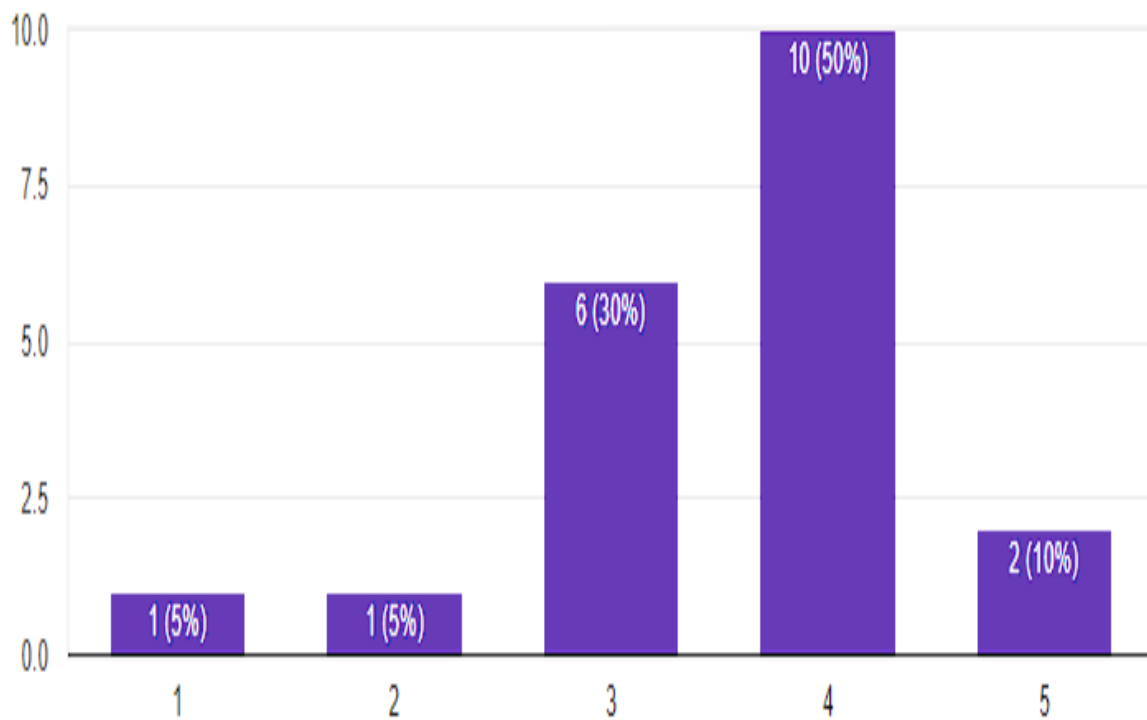


Figure 13. Questionnaires and surveys are frequently assessed.

#### 4.1.2 Section Two: Thoughtful Risk Management

The pie chart query in Figure 14 shows the important primary risks associated with digital transformation in microfinance. The survey has been done on five major risks, and from the percentage, it can be said that comparatively all of them got concerns from people. Here, technology obsolescence is 35%, concern regarding data privacy is 30%, cyber security threats are 25%, and the rest 10% have regarded customer opposition to change as the primary risk in microfinance for data transformation.

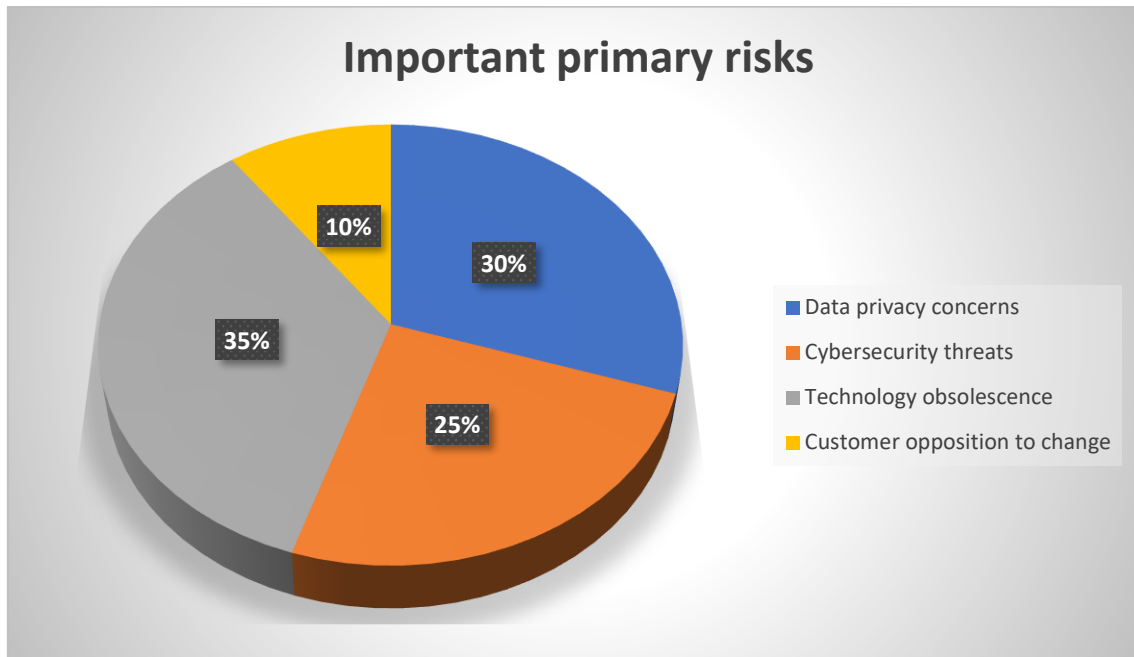


Figure 14. Important primary risks

Another question is the public response regarding the most successful risk mitigation strategy for microfinance institutions in percentage in Figure 15, results show here, among the three strategies, providing staff training on cybersecurity and complementing robust security measures both have the highest percentage, which is 40%, and conducting regular risk assessments has a 20% response.



Figure 15. Successful risk mitigation strategy

In the bar chart, the questions of the role of regulatory compliance in minimizing risks in digitalized in figure 16, results show microfinance institutions have been analyzed on a scale starting from 1 to 5. 45% of people have maintained their middle opinion, neither in favor nor in response. 35% of people replied in favor of some issues, and 10% were completely in favor, while others were not in favor.

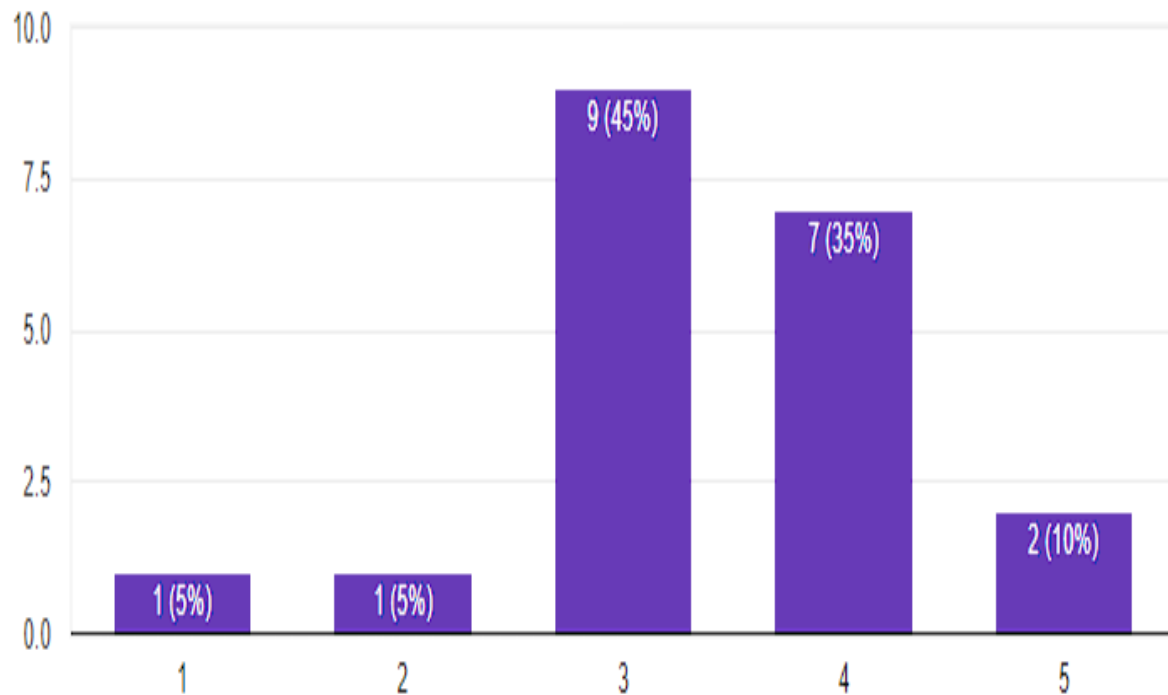


Figure 16. Regulatory compliance in minimizing risks.

#### 4.1.3 Section Three: Finding Customer Perspectives

Other questions in the analysis of public preference for digital banking over traditional banking methods, as shown in Figure 17 that increased accessibility and flexibility got the highest response, at 40%. Compared to this, other methods got a relatively low preference, with increased fees at 25%, slower processing times at 15%, limiting transaction alternatives at 10%, and lastly, reduced security and reliability at 10%, respectively.

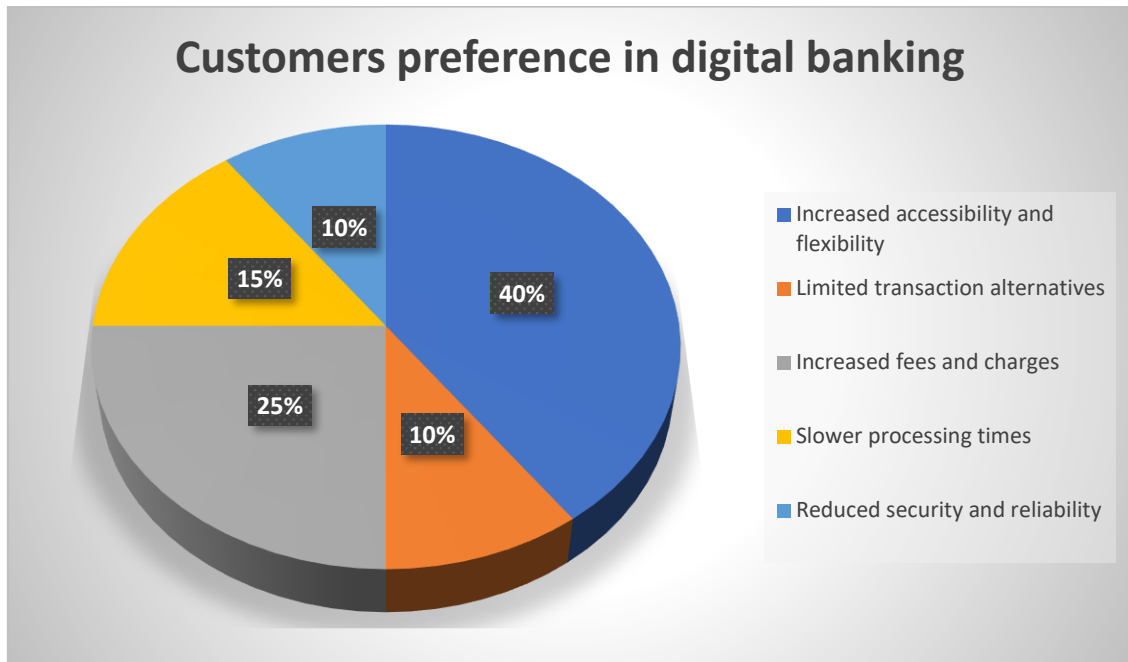


Figure 17. Customers preference in digital banking

Regarding the question of the factors influencing customers in adopting digital financial services in Figure 18, results show lower transaction costs have got 35%, and responses relating to other discussed factors have got close by percentage, which are accessibility of services at 25%, trust in technology at 20%, and safety in digital transactions at 20%, respectively.

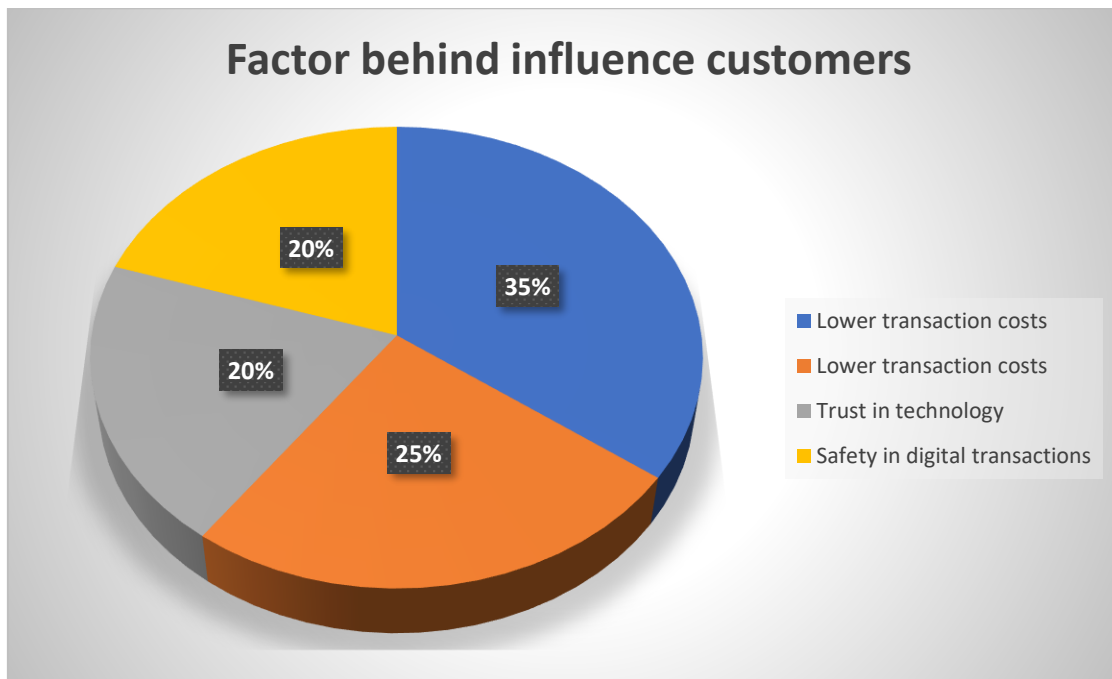


Figure 18. The factor behind influencing customers.



The following questions of this pie chart analysis are about people's responses regarding the dependability of online banking services in the microfinance industry in Figure 19, results show in the query, three options have received equal attention, which is 20%, and the options are concerns about system glitches, high levels of trust and confidence, and faster transaction processing. Then again, the option including more security than the traditional method has a slightly higher percentage (25%), and the last considered option, limited access to customer support, has gotten a 15% response.

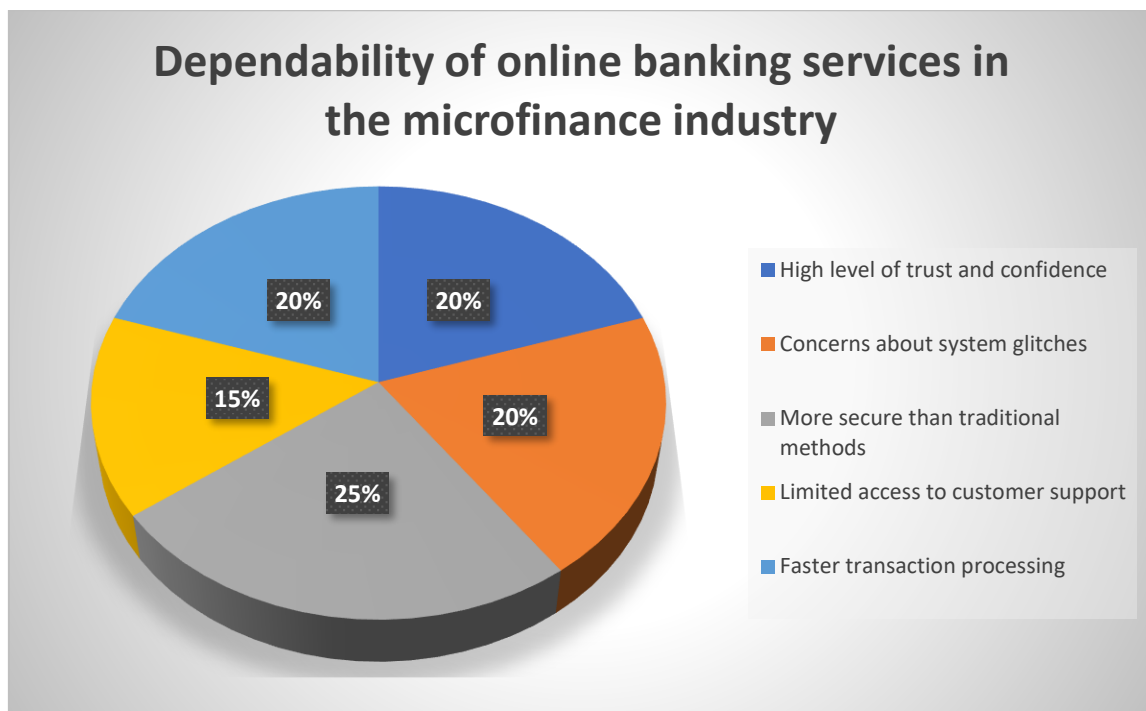


Figure 19. Dependability of online banking services in the microfinance industry

#### 4.1.4 Section Four: Challenges and Opportunities Analysis of Digitalization

Other questions are the most effective ways to deal with microfinance institutions to address the moral challenges of digitalization in Figure 20, results show the four effective ways analyzed in the pie chart, enforcing stringent data privacy policies has the most favored response, with 45%, to deal with microfinance institutions to address the moral challenges of digitalization. Then, conducting frequent ethical audits has the second-highest percentage (30%). Outsourcing moral decision-making and a lack of ethical consideration have the least favored responses, with 15% and 10%, respectively.

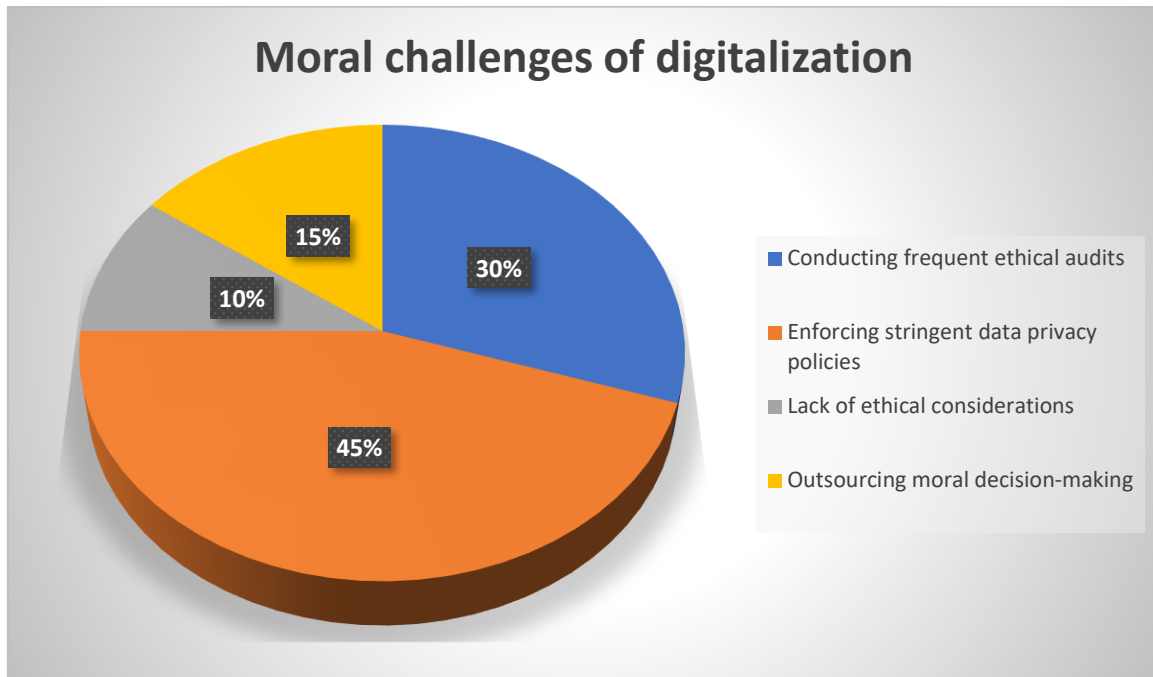


Figure 20. Moral challenges of digitalization

The question of which problem for microfinance organizations is the most significant to digitalization in Figure 21, the pie chart analyses the most significant problems related to the digital transformation of microfinance organizations. Among the four significant problems chosen, limited financial resources and technological infrastructure limitations have gotten equal public attention, which is 30%. Then again, the other two problems lack of legislative support and reliance on outdated methods have a lower, equal percentage, which is 20%.

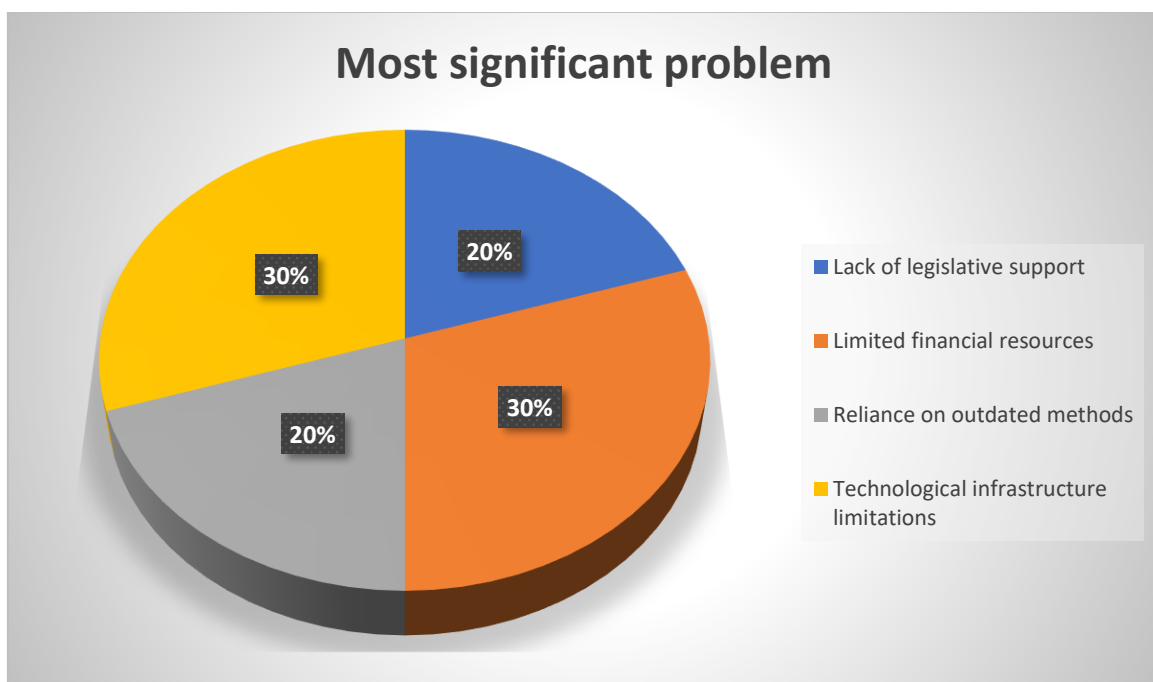


Figure 21. Most significant problem

The following question do you believe digital transformation can address financial inclusion challenges in Bangladesh in Figure 22, the results show the percentage in response to the question of whether digital transformation can address financial inclusion challenges in Bangladesh. Here, 85% of the public replied positively, which is quite high, and then the remaining 15% of the public denied the belief concerned.



Figure 22. Digital transformation can address financial inclusion challenges in Bangladesh.

Another question is how likely you are to recommend your preferred digital financial service provider to others in Figure 23, results show the analysis is about the recommendation of one's preferred digital financial service provider to others. 70% of people prefer to recommend the idea, which is very high, and 15% very likely disagree with the idea as they don't like it that much to recommend. The remaining 15% have remained neutral regarding the service.

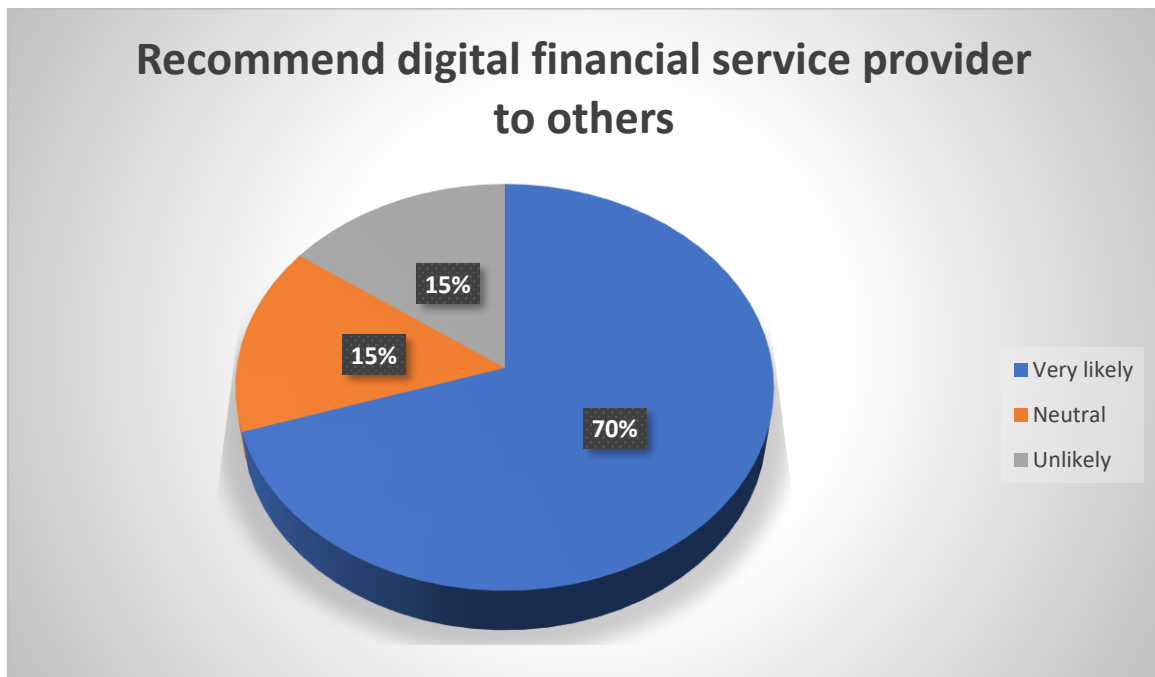


Figure 23. Recommend digital financial service providers to others.

The last question in the survey how happy you with your favorite digital financial service provider's user interface in Figure 24 are, the results show bar chart has labeled public satisfaction from 1 to 5 with their present digital financial service provider user interface. 1 to 5 scale measured very satisfied, satisfied, medium, normal, and low. 35% of people are extremely satisfied (rating 5), while 30% are satisfied with some recommendations (rating of 4). Then 20% are continuing their usage despite having issues, and the rest have expressed their dissatisfaction with the service provider. Level of happiness Considering the scale 1–5-point scale, 1 is a lower category of satisfaction and 5 is the highest category grade of happiness.

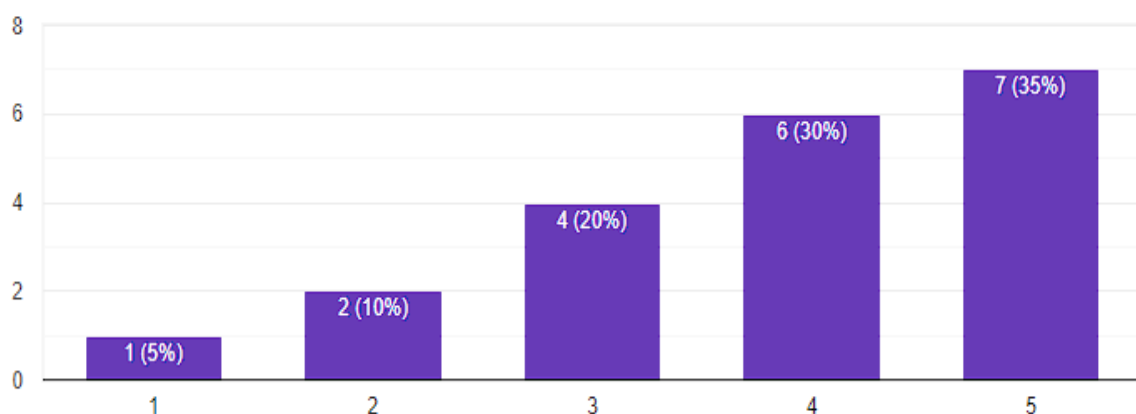


Figure 24. Level of happiness

## 4.2 Summary of Findings

The findings across the literature review chapter demonstrate that digital transformation approaches the crucial benefits for the microfinance institutions in Bangladesh, and represents significant challenges addressed. Microfinance institutions of Bangladesh can enhance their operational efficiency and cost reduction, improve customer service, and financial inclusion, expand outreach improve risk management, and socio-economic development through digital transformation. In Contrast, overwhelming technological barriers, data security concerns, and client resistance are important to implement the digital transformation.

This survey represented in Figure 11, the fact that 40% are non-essential issues that should be given less priority, as opposed to one quintal that is very crucial for the growth of the microfinance industry. 25% of the respondents to this question are indifferent about it in that they would not consider it an essential thing for the microfinance industry to develop. On average, 36 people argue for digital transformation to be the focus of near-term plans and a minority of 5% desire to run and own robots. In Figure 12, among all the data shown, the significance of the bar chart is that 50% of the participants were in favor of the concept of digital technology innovation, and 30% of students embraced the evaluation system. The key concerns that may cause problems in digital transformation among microfinance were specified issues of technology obsolescence, data privacy difficulties, cyber security threats, and complaints of innovation adoption from customers.

The public response in Figure 15 to risk mitigation strategies for microfinance institutions was categorized into three categories: training the staff, especially during computer use, using top-rated security systems, and performing the risk assessment at least every year. In Figure 16, over 45% of them believe further improvement of the regulatory framework is essential to limiting the risks of digital microfinance. In Figure 17, digital banking against traditional banking, for instance, prevailed if the public's preference leans towards it (40%), or if digital banking way increases the number of expenses, reducing the processing speed, the number of alternatives to the transactions, and insecurity and the absence of the reliability level as to the traditional banking way. Although digital financial services have some factors that might be a pretext under which customers resist these services, customers still have room to embrace them as shown in Figure 18. It is, permanently, the price for small transactions, the access to services, the good reliability of technology, and digital financial services, of which the security is greater than on other occasions.

The pie chart (Figure.15) analysis showed that three options received equal attention in number: problems that could arise with system glitches, the need to create a feeling of trust and comfort, faster transaction processing, and a more secure and reliable way of processing payment than the traditional forms with just limited interaction with customer service. The most preferred method for overcoming the moral issues of digitization was, however, establishing data privacy policies that were very strict, followed by carrying out ethical audits regularly. To consider the impacts of passing by moral decisions and not seeking ethical consideration were the least attractive responses.

Technical financing organizations for digital transformation were faced with limited financial resources, limited technical infrastructure, and, lastly, insufficient legislative support and loyalty to the old procedures. Figure 22 shows the answer to the question of whether digital transformation could address the financial inclusion issues was that 85 percent of the respondents gave their positive votes and 15 percent rejected the worry. Figure 23 shows the user's rating of the digital financial service providers will make them more promising, as the recommendation seems to be loved by 70% of respondents, while at the same time, the idea is unlikely to be disagreed with by 15% of them. Finally, Figure 24 shows consumer satisfaction with their current digital financial services user interface also classified into scales 1–5, along with their performance and importance.

#### 4.2.1 Customer Satisfaction in the Microfinance Landscape of Bangladesh

The tremendous consequences of digital innovations in microfinance across Bangladesh are redefining the way traditional credit is delivered, making room for online lending options by changing the growth trajectory. It makes no difference whether you are the buyer, as in the case of introducing new services or products to the market, or a microfinance institution (a small financial institution that allows low-income people who own small businesses to obtain loans). These remote places are linked to microfinance organizations via mobile banking and digital credit systems. This has increased productivity while also improving client satisfaction. It also saves time and relieves secondary stress. Internet candidates can also explain what is widely known today as a type of microfinance organization's promotion following the rapid growth of the internet, which allowed users to access services from anywhere in the world without having to visit the company's physical branch, which was an invention, particularly for rural regions where people were unfamiliar with any type of official banking services at all.

Digital changes have altered the flow of microfinance by slowing down paperwork, which lengthens the decision process; therefore, it has sped up loan processing. Customers only need to fill out the application forms online and get approval quickly, even in minutes, which improves their satisfaction and enables them to meet their financial requirements more quickly and efficiently.

Digital platforms not only provide MFIs with the ability to supply customer-demand personalized services but also apply data analytics and machine learning algorithms to provide these services in a more specialized manner. In this case, a consumer with regular repayment behavior may be allowed to open a savings account with competitive rates during a favorable period. Meanwhile, a regular saver may get a chance with lower interest rates. It is individualization that makes customer satisfaction possible by allowing them to feel identified and cared for by their financial service provider on a very personal level.

The digital revolution of microfinance in Bangladesh has resulted in considerable increases in client satisfaction by increasing accessibility, streamlining operations, and providing personalized services. However, obstacles such as the digital divide and data security concerns must be solved for all clients to fully benefit from digital financial services. Initiatives such as community digital centers and mobile banking agents have been established to help close the gap, but more work is needed to ensure that all sectors of the population can fully benefit from digital financial services. Furthermore, clients are concerned about the security of their personal and financial information, as any compromise could result in financial loss and destroy faith in microfinance companies. By responsibly and inclusively leveraging technology, MFIs can continue to enhance customer satisfaction and drive financial inclusion in Bangladesh.

#### 4.2.2 Challenges in implementing digitalization in Microfinance.

Bangladesh's microfinance business is facing hurdles as it transitions to a digital future, particularly in rural regions. Access to stable internet networks and cell phones is restricted, limiting the availability of digital banking services. To solve this, infrastructure development activities such as increasing internet coverage and providing subsidies for digital gadget purchases are required. Tailored educational and promotional activities should be developed to assist communities in incorporating digital technologies. A key concern is a lack of digital literacy among microfinance consumers, particularly those in rural areas who are unable to read or write. Clients require consistent and sophisticated training, such as workshops, interface design, and continuing assistance, to feel secure and comfortable utilizing digital technology.

The regulatory environment in Bangladesh would be the main factor influencing the implementation of microfinance projects because it is so complicated and constantly changing. Effective regulations with transparency and compliance are a fundamental factor in the promotion of digital financial services, to safeguard consumers' interests as well as sound financial arrangements. It is critical to demonstrate to regulatory authorities, MFIs, and other parties the balance between innovation on the one hand and risk mitigation on the other.

Additionally, the issue of data privacy and security becomes so apparent in the digital age that every piece of personal and private data is exposed or is subject to corrosion. MFIs should therefore comply with rigorous data protection regulations and equip themselves with advanced cybersecurity capabilities to prevent data breaches, especially in the case of people's personal information. Instilling trust among customers involves clear communication of data handling procedures and investing in cybersecurity infrastructure. Implementation of new digital solutions along with older systems is often quite a complicated and time-consuming undertaking, calling for substantial funds for the technology upgrades and linking of these two systems. MFIs should assess their existing IT capabilities and draw up a holistic plan for organizational change by moving from physical systems to online platforms.

Digital transformation in the microfinance sector faces challenges such as iterative transition, cost, sustainability, and the digital divide. Employees may be resistant to technology adoption due to the elimination of roles or learning new skills. A successful implementation system involving communication, training, and incentive programs is needed to overcome resistance and encourage innovation. Leadership support and a commitment to digital transformation are also crucial for organizational change. Digital transformation can be costly, especially for small MFIs with limited facilities. To overcome short-term and long-term challenges, an effective business model must be formulated, including new financial mechanisms, collaborations with tech suppliers, and revenue streams associated with digital services. Collaborative work between MFIs, regulators, and technology providers is essential to eliminating obstacles and creating a conducive environment for digital innovations in the microfinance sector.



## 5 Conclusion

This thesis addresses the digital transformation of the Bangladesh microfinance industry, demonstrating the process of adapting digital tools, the outcomes, and the obstacles that MFIs face. The paper explains how digitalization can improve microfinance operations reach, efficiency, and sustainability. The rapid expansion of mobile device usage and the internet has resulted in the emergence of digital financial services, for example, mobile banking, agent banking, and digital credit. These improvements for MFIs allow them to expand their space and provide additional access options to people in opposite locations.

From the survey results, it was revealed that 40% of the population is not fast enough to deal with time-consuming tasks, while 40% believe digitalization is one of the reasons for the development of microfinance. The majority of respondents are over thirty years old and are 26 years older than the participants. The main problems faced by microfinance organizations include technology lifespan, customer data security, and customer complaints. Risk management strategies include in-house staff training, installing the latest security systems, and conducting annual security checks. 45% believe more powerful policy instruments are needed to prevent and control specific risks.

The targeted customers include those who have been using digital banking for convenience and low-cost online financial services. Three options received equal attention: technical issues, confidentiality, deals happening at optimum speed, and payment methods being less persuasive to data penetration. Policies and ethics audits were seen as excellent means to uphold the ethical sphere. The technical financial foundations are insufficient, with insufficient infrastructure, unsustainable funding systems, and inadequate regulatory frameworks. 85% of residents believe digital finances are the solution to the problem of financial access.

The study, however, seems to confirm the belief that the use of digital technology only contributes positively to MFI performance in Bangladesh. The main advantages for financially more developed organizations are increased client base outreach, increased profitability and growth, and enhanced operational efficiency. In contrast, digitalization is thought to be a vital component that decreases risks, offers a chance for customer interaction, reduces costs, and maintains MFIs' financial stability in a cutthroat commercial climate. Future research should investigate the long-term impact of digital transformation on microfinance clients, particularly women and marginalized communities, as well as future technologies such as blockchain, artificial intelligence, and big data analytics. Comparative studies across countries may provide insights.

This thesis investigates how digitization has affected Bangladesh's microfinance industry, with a particular emphasis on how it contributes to financial inclusion and development. It demonstrates

how vulnerable communities can be empowered by microfinance institutions using digital technologies, promoting socioeconomic development and the reduction of poverty. To overcome obstacles, digitalization calls for cooperation from all parties involved. The thesis posits that Bangladesh may leverage the potential of digital microfinance to address structural difficulties and provide better futures for its population using cooperative projects, innovation in digital finance, and an inclusive strategy.

### 5.1 Challenges and Opportunities:

The digital transformation of microfinance institutions, or MFIs for short, in Bangladesh, presents both obstacles and opportunities. Cyber hazards, such as data breaches and financial fraud, are of major concern and must be addressed in a strategic manner, which may include the deployment of tougher cybersecurity measures. There is also a need for more specific steps to alleviate Bangladesh's perceived digital divide, particularly in remote locations and among rural people. However, regulatory compliance is also a challenge, as regulatory authorities are generally slower to respond to technological changes than to market trends. Infrastructure investment is critical for the fourth purpose of digital microfinance. Long-term and scalable expansion necessitates robust infrastructure support. Personnel development is critical for a successful digital transformation strategy, yet competent personnel and acceptance of change may be detrimental to success. The problems that continue to impede the implementation of digitalization in microfinance institutions are surmountable with the appropriate inspiration, and they may just be revealing the potential for collaboration and innovation in these organizations. The pace of technological innovation necessitates a continuous retooling of digital infrastructures, as well as an increase in both process investment and labor capabilities.

Moreover, the digital transformation of microfinance institutions (MFIs) in Bangladesh can potentially increase financial inclusion for millions of unbanked people. MFIs can reach previously underserved groups by utilizing mobile banking, agent banking, and digital payment solutions. Digital platforms also improve operational efficiency by simplifying procedures and lowering administrative expenditures. Data analytics and machine learning algorithms enable MFIs to personalize financial products and services to consumer needs while also mitigating credit risk. Fintech technologies like mobile wallets, digital credit scoring, and blockchain-based solutions can help MFIs diversify their product offerings and improve client experience.

Partnership with financial startup companies and technology providers has the potential to boost innovation and product development in the digital microfinance ecosystem. Strategic collaborations between MFIs, telecommunications firms, entrepreneurs in finance technology, and

government agencies can help to integrate digital financial services within existing ecosystems, improve interoperability, and promote financial inclusion. Despite challenges such as cybersecurity, computer proficiency, compliance with regulations, infrastructure, and human capital development, taking advantage of digitalization's opportunities can accelerate the integration of finance, empower marginalized communities, and drive long-term socioeconomic development in Bangladesh.

## 5.2 Recommendations for Future Research and Action

The future of this thesis appears to have some ideas, including the type of research required and, more importantly, whatever activities should be made to help solve the difficulties of digital transformation in Bangladesh's microfinance business. It is assumed that more research into longitudinal assessments is required to identify the long-term impact of employing digital microfinance for operations in the future. The second requirement is that the government provide a robust policy framework, including regulation and commitment from all stakeholders, to decrease the risks involved with microcredit, particularly when the economy varies.

It should foster an environment in which consumers are not deceived and lenders are not mistreated. Furthermore, capacity-building should be conducted to increase people's awareness of digital technology and foster it significantly among microfinance consumers, institutions, and the public. Furthermore, it is recommended that these initiatives be carried out through collaboration and conversation among MFIs, finch investors, telco firms, and development IGs to improve efficiency and resource sharing.

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## Appendix

### Quantitative research part questions-

#### Section One: Technological Adoption Assessing

1. What is your age group?

i) 18-25

ii) 26-35

iii) 36-45

2. What's your gender?

i) Male

ii) Female

3. On a scale of one to five, please evaluate the criticality of the following, for Bangladesh's microfinance institutions when assessing technological adoption.

i) 1

ii) 2

iii) 3

iv) 4

v) 5

4. In your opinion, how essential is the successful adoption of digitalization in microfinance? On a scale of one to five

i) 1

ii) 2

iii) 3

iv) 4

v) 5

5. On a scale of one to five, how Surveys and questionnaires are often used to evaluate digital technological adoption in microfinance institutions?

i) 1

ii) 2

iii) 3

iv) 4

v) 5

#### Section Two: Thoughtful Risk Management

6. Which are the most important primary risks associated with digital transformation in microfinance, in your opinion?

- i) Cybersecurity threats
- ii) Data privacy concerns
- iii) Technology obsolescence
- iv) Customer opposition to change
- v) System interruptions and failures

7. Which is the most successful risk mitigation strategy for microfinance institutions?

- i) Implementing robust security measures
- ii) Conducting regular risk assessments
- iii) Providing staff training on cybersecurity

8. In your opinion, how does regulatory compliance play in minimizing risks in digitalized microfinance? On a scale of one to five.

- i) 1
- ii) 2
- iii) 3
- iv) 4
- v) 5

### Section Three: Finding Customer Perspectives

9. What do customers prefer the most in digital banking compared to traditional banking methods?

- i) Increased accessibility and flexibility
- ii) Limited transaction alternatives
- iii) Increased fees and charges
- iv) Slower processing times
- v) Reduced security and reliability

10. Which factor influences customers to adopt digital financial services?

- i) Lower transaction costs
- ii) Accessibility of services
- iii) Trust in technology
- iv) safety in digital transactions

11. Which of the following do you feel about the dependability of online banking services in the microfinance industry?

- i) High level of trust and confidence
- ii) Concerns about system glitches

- iii) More secure than traditional methods
- iv) Limited access to customer support
- v) Faster transaction processing

#### Section Four: Challenges and Opportunities Analysis of Digitalization

12. Which are the most effective ways to deal with microfinance institutions to address the moral challenges of digitalization?

- i) Conducting frequent ethical audits
- ii) Enforcing stringent data privacy policies
- iii) Lack of ethical considerations
- iv) Outsourcing moral decision-making

13. In your opinion which problem for microfinance organizations is the most significant to digitalization?

- i) Lack of legislative support
- ii) Limited financial resources
- iii) Reliance on outdated methods
- iv) Technological infrastructure limitations

14. Do you believe digital transformation can address financial inclusion challenges in Bangladesh?

- i) Yes
- ii) No

15. How likely are you to recommend your preferred digital financial service provider to others?

- i) Very likely
- ii) Neutral
- iii) Unlikely

16. On a scale of one to five, how happy are you with your favorite digital financial service provider's user interface?

- i) 1
- ii) 2
- iii) 3
- iv) 4
- v) 5