

TRANSFORMATION OF THE BANKING SECTOR AND THEIR SERVICES IN BANGLADESH USING ARTIFICIAL INTELLIGENCE

Dr. Sarmistha Sarma*, **Komal Prity****

*Professor, Asian Business School, Noida, Uttar Pradesh

**Student, Asian Business School, Noida, Uttar Pradesh

ABSTRACT

The present day is the age of digitalization, and artificial intelligence (AI) has played a major role in our daily lives. The acceptance of digital technology has significantly transmuted Bangladesh's financial industry in the preceding decade and a half. The advancement of technology has given a new dimension to various banking sectors and their services in Bangladesh. The purpose of writing this paper is to understand how AI works in the various elements of the financial sector to make it more effective with prime utilization of resources and accuracy of predictions and decisions. This research report identifies AI adoption opportunities for Bangladesh that can transcend its future prospects towards greater prosperity. This paper explored the performance and efficiency of banks working in Bangladesh. This paper gives precise suggestions, one of which is adopting the integrated AI and blockchain model, which will be much safer and more effective in allocating maximum security, privacy, and accuracy. This paper explains the threats or challenges at different levels of banking facilities in Bangladesh where banks should avoid the implementation of AI or robotics in banking operations.

Keywords: *Artificial Intelligence, Digital Technology, Blockchain Technology, Machine Learning, Robotics, and Banking Services.*

INTRODUCTION

The banking sector of Bangladesh has undergone a remarkable transformation in recent years, marked by fundamental transformation in its operations, service delivery, and customer engagement. This transition has been initiated by a potent force of change, i.e., AI. AI's unprecedented capacity to process, analyse, and learn from data has developed as a revolutionary catalyst, reshaping the domain of financial services in Bangladesh.

As a country with a growing economy and a burgeoning population, Bangladesh's banking sector is crucial in facilitating economic growth, financial inclusion, and modernization. This

journey of transformation encompasses areas such as customer service, fraud detection, risk management, and product development. The integration of AI chat agents has redefined customer interactions, enhancing their responsiveness, efficiency, and available round the clock.

In the context of risk management, machine learning algorithms and AI's predictive analytics have improved the reliability of credit scoring and fraud detection, minimizing exposure to financial risks and fraudulent activities. This transformative approach has not only improved its service standards but has also supported financial inclusion, reaching financially excluded and financially marginalized populations by offering more accessible and affordable banking services through digital channels. The implementation of AI technologies has ushered in an innovative age of efficiency, innovation, and risk management in banking. However, the integration of AI in banking services also brings forth a complex set of legal obstacles and evaluations that require careful examination.

AI IN BANKING: A TRANSFORMATIVE REVOLUTION

AI's implementation in banking has led to a plethora of benefits. It has significantly enhanced customer experiences by enabling personalized services, chatbots for customer support, and efficient data analysis. AI-driven algorithms have revolutionized risk assessment, fraud detection, and investment recommendations, making the banking sector more flexible and secure.

LEGAL IMPLICATIONS OF AI IN BANKING

- 1. Data Confidentiality and Security:** In the banking sector, this primarily involves complying with laws such as the General Data Protection Regulation (GDPR) and local data protection laws in Bangladesh.
- 2. Transparency and Explainability:** Banks need to ensure that their AI systems are transparent and explainable to comply with regulations and to build trust with customers and regulators.
- 3. Fair Lending and Bias:** The legal framework in banking requires that lending practices are fair and unbiased. Regulators closely monitor AI systems to prevent discriminatory practices.

4. Regulatory Compliance: AI applications must adhere to existing financial regulations, and sometimes new regulations specific to AI may be required.

5. Contractual and Liability Issues: AI contracts and liability for AI-driven decisions require legal scrutiny. Determining who is liable in cases of AI errors or misconduct is a complex legal question that banks need to address.

THE ROLE OF LEGAL EXPERTS

As the banking sector increasingly relies on AI technologies, the demand for legal experts who specialize in AI and financial law has grown. Legal professionals play a vital role in ensuring that banks navigate the evolving legal landscape successfully. They help banks interpret and comply with existing regulations, lobby for new legislation where needed, and address legal threats associated with AI integration.

LITERATURE REVIEW

1. Md. Shihab Uddin Khan et al. (2021): This study aims to explore the prospective role of AI within the banking sector. Its objectives encompass several key areas, such as exploring into the conceptual aspects of AI and RPA, delineating the worldwide landscape of AI, and its integration within banks and financial institutions within Bangladeshi banks. The paper aims to propose recommendations to enhance the preparedness for AI-powered digital banking in Bangladesh.

2. Mustak Ahmed (2022): The objective of this research report is to explore the potential opportunities for AI adoption in Bangladesh, aiming to propel its future prospects towards greater prosperity. Bangladesh has made impressive milestones in applying various technologies across sectors. Even with these innovations, obstacles remain continue in the integration of AI. The government has executed preventive strategies by introducing various policies and regulations to refine the implementation of AI in Bangladesh.

3. Walid Al-Saqaf and Nicolas Seidler (2017): This article seeks to contribute to the existing body of knowledge by examining the potential applications of blockchain technology and their boundaries. It investigates whether the fundamental operational principles of blockchain could serve as mechanisms to reduce excessive online surveillance, censorship, and human rights violations perpetuated by the consolidation of control over online

information by a few entities. Through this exploration, the article aims to spark scholarly interest in comprehending both the possibilities and concerns regarding the potential societal influence of blockchain technology.

4. Syeda Nusrat (2021): The accessibility of financial services in Bangladesh has historically been constrained. This study investigates the potential of utilizing blockchain technology to enhance financial inclusion in Bangladesh. It explores the utility of blockchain, identifies challenges hindering its successful implementation, and offers recommendations aimed at facilitating its effective application in the banking sector.

5. Abdullah Al Hussain et al. (2022): The essence of blockchain technology lies in its distributed database system, which prioritizes transparency, accountability, public accessibility, immutability, and traceability of stored data. The lack of a well-structured Blockchain Technology Acceptance Model (TAM) in Bangladesh restricts the perspective of local developers and researchers. Sectors such as governance, healthcare, security, privacy, agriculture, information authentication, cryptocurrencies, internet architecture, and data management are unable to utilize the complete capabilities of this technology. This research focused on Bangladesh, exploring various aspects of blockchain technology and its potential applications in these sectors.

6. Md. Mainul Islam Ron et al. (2023): The growing interest in blockchain technology within the mobile banking system arises from its strong security measures, enhanced data accessibility, accelerated transaction processing, and decentralized database structure. Exceeding fundamental transactions, cellular banking provides access to account information, facilitates payments, manages deposits and withdrawals, enables transfers, offers investment insights, provides ATM support, and provides diverse content services.

One pivotal technology within this aspect is Distributed Ledger Technology (DLT), commonly referred to as blockchain. This tamper-proof digital ledger system securely stores and disseminates data across connected nodes. This study specifically focuses on integrating consortium blockchain technology and the Proof of Authority (POA) consensus protocol into Bangladesh's mobile banking system. It discusses a proposed blockchain architecture model, outlining its classification and consensus protocol.

AI IN THE FINANCIAL SECTOR OF BANGLADESH

Bangladesh has adopted AI technologies for the banking sector for a smoother electronic transition with their customers. Due to the complexity of those sectors, they accepted AI technology quickly and used it to boost services related to customers. The government has planned to install a system at the bank to reduce fraud-related activity. Modification of some government policies leads to changes in developing finance sectors.

AI and ML make it easier to magnify the capability to forecast economic, financial and risk events, modify the financial market, upgrade risk management and compliance, reinforce provident oversight, and provide central banks with new apparatus to pursue their monetary and macro-prudential instruction.

Artificial intelligence (AI) is increasingly being used in various elements of the financial sector in Bangladesh to enhance efficiency, accuracy, and decision-making. AI is applied in the financial sector in Bangladesh as follows:

- **AI Chat Agents:** AI chat agents such as virtual assistants and chatbots are used to provide immediate customer support, resolve concerns, and help in fundamental transactions.
- **Natural Language Processing (NLP):** NLP technology is used to analyse customer feedback and sentiment, enabling banks to improve their services and products.
- **Credit Scoring Models:** AI algorithms are used to assess the creditworthiness of borrowers by analysing their financial history, transactions, and other data.
- **Fraud Detection:** AI is employed to detect and prevent fraudulent activities by identifying unusual patterns and anomalies in transactions.
- **Robo-Advisors:** AI-driven robo-advisors provide investment advice and portfolio management services to clients, supporting them in making knowledgeable investment choices.
- **Algorithmic Trading:** AI algorithms execute trades based on market data, identifying profitable opportunities, and mitigating risks.
- **Big Data Analytics:** AI is used to process and analyse large volumes of financial data to identify trends, customer preferences, and market opportunities.
- **Predictive Analytics:** AI models make predictions about market trends, customer behaviour, and investment opportunities, enabling more informed decision-making.

- **Cybersecurity:** AI-based security systems help ensure the security of sensitive financial data against cyber threats, and breaches.
- **Compliance Monitoring:** AI is used to monitor transactions and ensure adherence to regulatory requirements, reducing the risk of non-compliance.
- **Personalization:** AI helps banks personalize their services by analysing customer data to offer tailored product recommendations, and experiences.
- **Churn Prediction:** With the assistance of AI predictive models, banks can anticipate when customers are on the edge of leaving, allowing banks to take proactive steps to retain them.
- **Robotic Process Automation (RPA):** RPA is applied to automate regular responsibilities like data input and document processing, reducing operational costs, and improving efficiency.
- **Workflow Optimization:** AI helps optimize internal processes, such as loan approval workflows, by identifying bottlenecks and suggesting improvements.
- **Anti-Money Laundering (AML):** AI systems assist banks in monitoring transactions for suspicious activity and ensuring compliance with AML regulations.

To make AI more effective in the financial sector in Bangladesh, banks need to:

- Invest in AI infrastructure, including data storage and computing resources.
- Train and upskill their staff to work with AI systems.
- Collaborate with AI solution providers and fintech start-ups to access the latest technologies.
- Ensure data privacy and security to build trust with customers and regulators.
- Continuously update and improve AI models to stay competitive and compliant with changing regulations.
- AI can significantly enhance the efficiency and accuracy of financial operations while providing valuable insights for decision-makers in Bangladesh's banks.

AI ADOPTION OPPORTUNITIES FOR BANGLADESH AND ITS FUTURE PROSPECT

The present age is the age of digital transformation, and artificial intelligence has played a crucial role in daily life. From the perspective of Bangladesh, the AI has played a crucial role in making them a rapidly developing country in South Asia. Bangladesh has recently acquired all the technologies to expand every sector. The government has implemented various policies and rules to improve the application of AI in Bangladesh. The actual suggestion of this technology will help Bangladesh make the nation better. In this light, it is important in the context of Bangladesh's governance of to take some innovative steps with a view to execute AI across all service sectors.

With the technological globalization and services, progressing and undeveloped countries are also acquiring the application of artificial intelligence. Emerging nations such as Bangladesh have been able to achieve improvement in the social lives of their people by making it easier, and by contributing benefits in terms of medical care, crime control, education, and means of transportation. Extensive adoption of artificial intelligence is responsible for the new employment options of the new generations in Bangladesh. Moreover, these new options enable more educational prospects for the students, which will enable the future generation to be theoretically and practically exposed to different aspects of AI applications.

Bangladesh can acquire a lot from the great and strategic use of AI in terms of future possibilities. AI has so far been effective in several sectors of Bangladesh. The government can incur more profit from AI by applying it in different ways. The administrations of different sectors should recruit and involve more experts to explore new breakthroughs in the technological field with the maximum benefit from AI.

AI adoption presents numerous opportunities for Bangladesh that can help transcend its future prospects toward greater prosperity. AI integration has the capacity to drive economic growth, increase efficiency, and improve living standards for the people of Bangladesh. The following segments highlight important fields where AI can make an important impact:

- **Agriculture and Food Security:** AI can be used for crop monitoring, disease detection, and precision agriculture, improving crop yields and food security.

- **Healthcare and Telemedicine:** AI-powered diagnostic tools can extend healthcare access to underserved areas, in the course of predictive analytics assist to manage disease outbreaks and healthcare resources more effectively.
- **Education and Skill Development:** AI-driven online education platforms can provide accessible and personalized learning experiences, promoting skill development and increasing the employability of the workforce.
- **E-commerce and Retail:** AI can enhance customer recommendations, optimize supply chain management, and improve the overall e-commerce experience, driving growth in the cyber marketplace.
- **Financial Inclusion:** AI can help expand financial inclusion facilities to the financially marginalized populations by enabling digital banking, microloans, and risk assessment for previously underserved customers.
- **Infrastructure and Smart Cities:** AI can improve traffic management, waste disposal, and energy efficiency in urban areas, contributing to more sustainable and liveable cities.
- **Manufacturing and Industry 4.0:** Adoption of AI-driven automation, robotics, and predictive maintenance can enhance the competitiveness of the manufacturing sector and promote exports.
- **Energy and Sustainability:** AI can optimize energy production and consumption, increasing energy efficiency, and reducing environmental impact.
- **Public Services and Governance:** AI can streamline public service delivery, enhance e-governance, and improve transparency in government operations.
- **Textile and Garment Industry:** AI can be used for quality control, production optimization, and supply chain management in the textile sector, which is a significant contributor to Bangladesh's economy.
- **Financial Technology (Fintech):** AI-driven Fintech solutions can facilitate faster and more secure financial transactions, promote financial literacy, and improve access to credit for individuals and small businesses.
- **Disaster Management:** AI can aid in advance cautionary systems for natural disasters and assist in the sphere of disaster relief and recovery efforts.

To maximize the potential benefits of AI adoption, Bangladesh should focus on the following:

- **Education and Workforce Development:** Invest in education and training programs to develop a skilled AI workforce that can drive innovation and implementation.
- **Regulatory Framework:** Establish clear and supportive regulations for AI adoption, ensuring data privacy and ethical AI use.
- **Research and Innovation:** Promote research and development in AI technology and support start-ups and innovation hubs.
- **Infrastructure and Connectivity:** Improve digital infrastructure, including internet access and data connectivity, to enable widespread AI deployment.
- **Public-Private Partnerships:** Support collaboration between government, academia, and the private sector to drive AI initiatives and investments.

THE PERFORMANCE AND EFFICIENCY OF BANKS OPERATING IN BANGLADESH

The performance and efficiency of banks operating in Bangladesh can vary widely depending on various factors, including the bank's size, management, business strategies, and market conditions. Banks in Bangladesh are subject to regulations and oversight by the Bangladesh Bank (Central Bank of Bangladesh), which is critical for ensuring the stability and efficacy of the banking sector.

It is important that the proficiency and efficacy of individual banks vary, and some banks may outperform others in specific areas. Periodic assessments and evaluations by the Bangladesh Bank and independent credit rating agencies help monitor and ensure the health within the banking domain in Bangladesh.

The economic advancement of Bangladesh heavily relies on the banking sector, yet it faces several difficulties like liquidity issues, capital shortages, non-performing loans, inefficiencies, and so on. Well-organized banks can achieve maximum profit using the minimum amount of inputs, like operating and interest liabilities, asset pool, capital pool, total investment, total shareholders' equity, and the minimum number of branches and employees. Following is the performance evaluation of banks:

- **Capital Sufficiency of Banks:** Higher capital sufficiency increases the depositors' confidence and prevents the banks from going bankrupt in an unfortunate situation.

- **Asset Quality of Banks:** To a large extent, the profitability of a bank depends on the potential of its assets to generate income. Non-performing loans can intimidate the quality of assets.
- **Management Soundness of Banks:** The survival and profitability of a bank depend on the management soundness of the bank.
- **Earnings Capability of Banks:** If the bank has better earnings capability, it can afford to assist with future unforeseen shocks. As a result, higher earnings capability indicates the better performance of the bank.
- **Liquidity Position of Banks:** Every bank should continue to maintain a reserve of liquid funds to hold its short-term liabilities and meet the demand for cash from its customers. If it fails to meet the demand of its customers, then it is known as a liquidity risk.
- **Vulnerability to Market Risk:** Vulnerability to market risk is the standard to which changes in lending charges, international currency rates, equity prices, and commodity prices negatively impact the earnings of the banks.

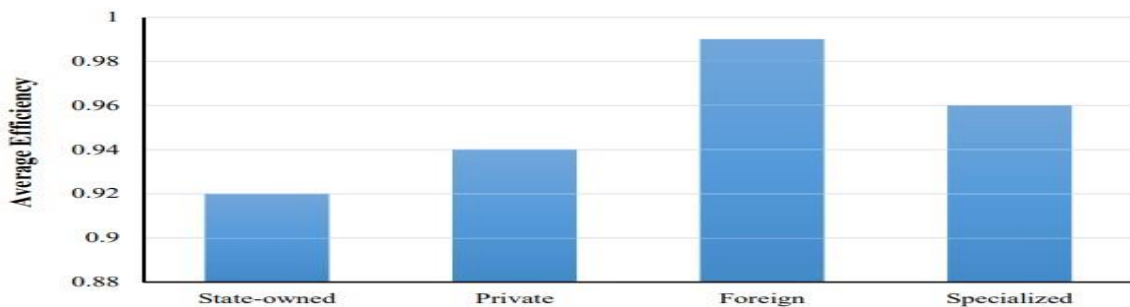


Fig. 01: Average Efficiency of Different Categories of Banks in Bangladesh

Efforts to improve the proficiency and efficacy of banks in Bangladesh often involve regulatory reforms, technology investments, risk management enhancements, and corporate governance improvements. Plus, competition and customer expectations continue to drive innovation and efficiency in the sector. Presented below are some important aspects that influence the performance and efficiency of banks in Bangladesh:

- **Asset Quality:** The quality of a bank's loan portfolio is a critical indicator of its performance. Non-Performing Loans (NPLs) can affect a bank's profitability and overall stability. Banks with effective credit risk management tend to perform better.

- **Profitability:** A bank's profitability is a key indicator of its performance. Factors such as interest profit, fee revenue, and cost management hold a key responsibility in determining a bank's financial health.
- **Capital Adequacy:** Adequate capital is important to absorb losses and support growth. Banks must satisfy the minimum capital standards as per Basel III standards to ensure stability.
- **Liquidity Management:** Managing liquidity effectively is essential for meeting depositors' demands and fulfilling the bank's obligations. Liquidity risk management is essential for continuing financial stability.
- **Technology Adoption:** The efficiency and competitiveness of banks often depend on their capability to adopt modern technologies, incorporating online banking, mobile banking, and digital payment systems. Efficient use of technology can optimize customer service and operational efficiency.
- **Corporate Governance:** Effective corporate governance techniques, including transparent financial reporting, effective risk management, and ethical behaviour are critical for a bank's long-term success.
- **Regulatory Compliance:** Banks must adhere to regulations and guidelines set by the Bangladesh Bank. Compliance with Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations is especially crucial.
- **Market Competition:** Market rivalry in banking can impact the proficiency and efficacy of banks. Banks need to adapt to changing market dynamics and customer preferences.
- **Economic Conditions:** Economic factors such as interest rates, inflation, and overall economic stability can influence a bank's performance. An unstable economic environment may pose challenges for banks.
- **Customer Base:** Building a strong and diverse customer base, including retail and corporate clients, can positively impact a bank's revenue and growth prospects.

ADOPTING THE INTEGRATED AI AND BLOCKCHAIN MODEL IN MAXIMUM SECURITY, PRIVACY, AND ACCURACY

AI is a tool that has the capacity to derange and transform entire industries. The application of AI in business has been mainly allowed by the AI-powered operational machine learning

technology to carry out specific tasks. The technology and the term itself can be traced to the mid-20th century, when scientists and researchers first began to explore the idea of intelligent machines. They started to generate algorithms and software that were able to perform rudimentary activities that would typically necessitate human intelligence. Quantum computation and neuromorphic computation represented significant milestones in the advancement of artificial intelligence.

The blockchain is a technological innovation that keeps important data secured and encrypted, which will switch the banking sector in Bangladesh. Blockchain technology can open up a lot of possibilities for Bangladesh. From sharing rides to the financial sector, land management, and medical fields, it is possible to capitalize on numerous benefits from this technology. It is a kind of database (DB). In other words, a digital ledger is a ledger or record of blockchain transactions. Each discrete record is called a block that is linked together in a list called a chain. Every block in the blockchain is fully immutable. Immutable means that once a block is added to the chain, it is not possible to change it. The blocks perch beside each other in the order of their creation. Each block has knowledge of which block is before it. This field of information technology is now being accepted in many countries. Exertion has also started on this issue in Bangladesh. If this technology is put in place at the government and private levels, Bangladesh will accelerate the digital process.

Blockchain can transmute the banking sector. All the branches have a large ledger to note all the transactions of the bank, and the banks that use banking software have this note in the database (DB). This large ledger is known as a laser. However, for an authentic transaction, it must have an entry in the bank ledger. A blockchain is a laser that has many such blocks besides. Each block holds all the data of the transactions that have transpired in the world periodically. This data is available but encrypted, which means everyone can view it but cannot read it. For reading that data, a private key is required. This means that if a person transacts here, only that person can read all the details of the transaction from here using its private key; no one else can.

So, this transaction is real-time, problem-free, paperless, and cost-effective as well. As a result of this fortunate transaction, many banks in Bangladesh are anticipated to come up with such automated techniques in trade to furnish comfortable service to their customers. Transaction banking is switching quickly through the use of digital technology.

The adoption of an integrated AI and blockchain model in the banking sector in Bangladesh has the potential to bring significant benefits. The following are some ways in which this model could prove beneficial for banks in Bangladesh:

- **Security:** Bangladesh has faced challenges related to cybersecurity and data breaches. Blockchain technology's immutability and cryptographic features can provide enhanced security for financial data. It can secure sensitive data, preventing unauthorized access and tampering.
- **Privacy:** The privacy of financial data is of utmost importance. Blockchain's permissioned network can allow banks to control access to sensitive information, ensuring that customer data remains confidential. AI can assist in enforcing privacy rules and detecting any breaches of privacy.
- **Accuracy:** Ensuring the accuracy of financial data is crucial for banks. Blockchain's stability ensures post data acquisition, it remains accurate and consistent. AI can help in data validation and reconciliation, reducing errors caused by manual processes.
- **Complex Tasks:** Banks in Bangladesh often deal with complex financial tasks. AI can automate processes like risk assessment, fraud detection, and customer service, making these tasks more efficient and accurate. Additionally, smart contracts on the blockchain can simplify complex financial agreements and reduce the requirement for intermediaries.
- **Transparency:** Transparency is essential for trust in the banking sector. Blockchain's distributed ledger technology provides transparency by recording all transactions on a ledger accessible to authorized parties. This can help to improve trust and accountability.
- **Compliance:** Banks in Bangladesh must adhere to various regulatory requirements.

Blockchain and AI can assist banks in meeting these requirements by providing a transparent and auditable record of transactions. This can simplify compliance reporting and reduce the threat of regulatory penalties.

- **Financial Inclusion:** Bangladesh has achieved notable advancements in improving financial inclusion. AI and blockchain can further this goal by providing more efficient and cost-effective banking services, particularly for those in underserved areas.

THREATS OR CHALLENGES AT VARIOUS LEVELS OF AI OR ROBOTICS ADOPTION IN BANKING OPERATIONS

While AI and robotics offer significant benefits to the banking sector in Bangladesh, there exist particular obstacles challenges and threats that may necessitate caution and avoidance in some areas, as follows:

- The bank should avoid adopting AI or robotics beyond the regulatory boundaries, even though the adoption of AI or robotics could have yielded better results. Banks also must think about the long-term ROI of AI or robotics.
- When the bank's resources are not capable enough to utilize the capacities of AI or robotics to the fullest, it should not invest in AI or robotics. Instead, they should first invest in human resources development because, without placing the right resources in the right places, entire automation can fail, no matter how robust it is.
- There are numerous hazards and vulnerabilities posed by artificial intelligence in the banking industry, ranging from its difficulty in interpretation to its biased nature, narrow focus, and usability issues with other systems, which banks must evaluate if they decide to use AI in their systems. Banks should begin with the least crucial system and work their way up.
- The bank avoid or go off this AI adoption. Banks can benefit from AI and big data solutions with the proper use of applications.
- If AI-based solutions are not secured or if information regarding customers and banking processes is not ensured with proper confidentiality, the integration of AI or robotics in banking operations or services should be avoided or perished.
- The production and maintenance of AI require high costs as they require very costly and complex machines. The procedure to restore the system and recover lost data may require a huge amount of time and money. So, before implementing AI within the banking sector, banks should maintain the deep thought about this challenging issue because if banks cannot recover from critical AI failure to start banking operation for a long time, it will bring us disastrous destruction in business.

Despite the tremendous benefits of AI adoption in banks, there are some scenarios explained below where banks may avoid implementing AI:

- **Highly Expensive:** Because artificial intelligence is extremely complicated, it necessitates exorbitant production and maintenance costs. AI also consists of powerful software programs that must be updated on a regular basis to match the changing needs of the environment.
- **Wrong Judgment Calls:** Although artificial intelligence can learn and grow, it cannot make decisions like humans. In specific circumstances and judgment calls, only humans can make decisions, which AI may never be able to achieve. Replacing adaptive human behaviour with AI may result in illogical behaviour within humaning ecosystems.
- **Risk and Take Control Away from Humans:** There is a perpetual concern about AI supplanting humans. Artificial intelligence can give a lot of power to the few people who control it. AI poses the potential to take authority away from humans while demeaning behaviours in a variety of ways.

INNOVATIONS ARE TRANSFORMING THE BANKING SECTOR IN BANGLADESH

The acquisition of digital technology has significantly transmuted the financial sector of Bangladesh in the last fifteen years, leading to millions of under-banking services that have even covered the village level. The transformation made it simpler for customers to get these services, as they could execute their transactions from the comfort of their homes. Besides the improvement of the traditional banking system, the initiation of Mobile Financial Service (MFS) providers, payment service providers, and fintech has crucial impact on acquiring technological innovation in the country's banking system. Apart from agent banking taking banking services to villages, banks are turning out Cash Recycling Machines (CRMs) that produce faster deposits, and internet banking is making possible the customer's trouble-free cash withdrawal, deposit, and fund transfer services.

1. Mobile Financial Services (MFS): 10 years ago, utilizing financial products and approaches to financial services were not available and were also expensive for many individuals and businesses in Bangladesh.

Mobile Financial Services

Mobile Financial Services (MFS) comparative summary statement of July, 2023 and August, 2023

Serial no.	Description	Amount in July, 2023	Amount in August, 2023	% Change (July, 2023 to August, 2023)
A.	Industry Wise Information			
1	No. of Banks currently providing the Services	13	13	
2	No. of agents	1601445	1618988	1.1%
3	No. of registered clients in Lac	2096.14	2124.20	1.34%
4	No. of active accounts in Lac*	712.42	819.63	15.05%
5	No. of total transaction	483531787.00	512290724.00	5.95%
6	Total transaction in taka(in crore BDT)	98306.75	109555.15	11.44%
7	No. of daily average transaction	15597800.00	16525507.00	5.95%
8	Average daily transaction (in crore BDT)	3171.19	3534.04	11.44%

Fig. 02: MFS Comparative Summary Statement of July 2023 and August 2023

The initiation of MFS, which permits its customers to regulate financial transactions remotely using a mobile device, has paved the way for millions of people to be added to the financial system.

2. Agent Banking: Bangladesh Bank initiated agent banking in their nation in 2012 by issuing a guideline pointing to providing a safe alternate delivery channel of banking services to the needy and underserved population who normally live in geographically remote areas beyond the reach of traditional banking networks. The agent banking sector saw quick growth as a substitute for the branch-based banking model in Bangladesh, especially in rural areas where arranging full-fledged offices is not economically feasible due to their low business volume.

As per the BB data, the total count of deposit accounts through agent banking was 1.92 crore as of April 2023. The total number of male accounts was 9,454,085, female accounts were 9,458,239, and other deposit accounts were 2,85,519. As per the central bank data, the total count of deposit accounts through agent banking was 1.98 crore as of June 2023.

3. Internet Banking: Internet banking (also called online banking) permits users to conduct financial transactions over the internet and furnishes consumers with practically every service formerly available only through a local branch, like deposits, transfers, and bill payments. Banks started achieving a wide range of inventiveness in 2010 as a part of their efforts to encourage customers to acquire the digital window. As per the most recent figures, the total

count of online banking customers enlarged to a record 74.4 lac in July 2023, a rise from 54.7 lac in July 2022, and 62.5 lac in December 2022. Bangladesh Real Time Gross Settlement (BGRTGS) and Bangladesh Electronic Funds Transfer Network (BEFTN) governed by Bangladesh Bank have also enhanced internet banking. Customers can immediately settle transactions of large volumes through RTGS, while BEFTN helps them execute retail transactions within a day.

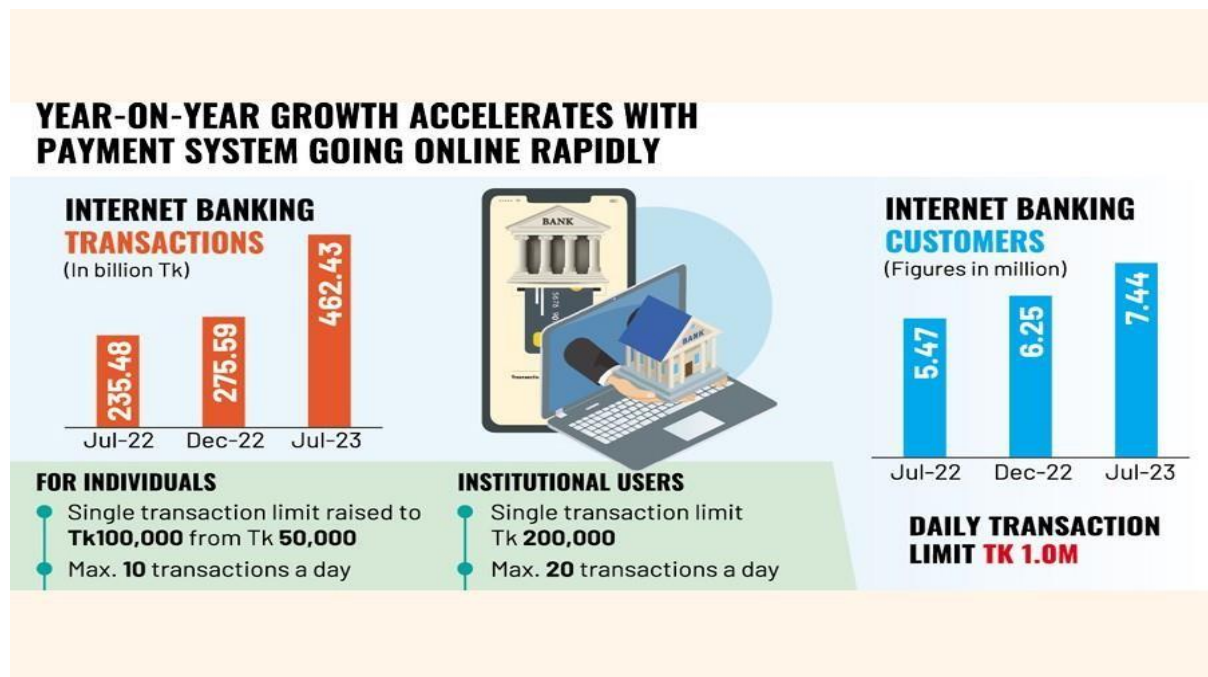


Fig. 03: Internet Banking Customers and Transactions

4. CRM: Cash Recycling Machines (CRMs) present a technology that modifies the country's financial sector. Banks are strongly installing CRMs to provide faster deposit and cash withdrawal services to customers. A CRM receives cash, counts the notes, validates them, and credits the amount in accounts on an actual basis. Serving banks do this aside from the manual labour required for the service. The new technology is also permitting customers to deposit and transfer cash into others' accounts. Banks in Bangladesh began setting up CRMs in 2017. The number of CRMs in functioning was 2,668 as of January 2023, up 111% year-on-year, according to data from Bangladesh Bank. The total transactions through CRMs increased 70% year-on-year to Taka 6,380 crore at the same time.

5. E-KYC: Opening an account without visiting a bank has always been awkward work for customers. In January 2020, the Bangladesh Financial Intelligence Unit released the electronic Know Your Customer (e-KYC), making it possible for customers to bank accounts in just five minutes, a line of action that formerly took two to four days. The system is now cutting the existing KYC-related costs by as much as 80%.

These transitions are not just transmuting the way banking services are furnished but are also inflating financial inclusion and availability for a broader segment of the population in Bangladesh.

IMPACT OF ARTIFICIAL INTELLIGENCE ON THE BANKING SECTORS AND ITS IMPLICATIONS

Artificial intelligence has had a significant impact on the banking sector in Bangladesh, as it has globally. Listed below are some fundamental pathways in which AI has influenced the operations, services, competitiveness, regulatory framework, and customer experiences in the Bangladeshi banking industry:

- **Process Automation:** AI-powered tools and algorithms have been used to automate various manual and time-consuming tasks in banking operations, such as data entry, document processing, and customer on-boarding. This has resulted in improved operational efficiency and reduced the risk of errors.
- **Chatbots and Virtual Assistants:** Many Bangladeshi banks have adopted AI-driven chatbots and virtual assistants to provide 24/7 customer support, answer queries, and assist with routine banking tasks, improving customer service availability.
- **Personalized Recommendations:** AI algorithms analyse customer data to offer personalized product recommendations and financial advice, enhancing the customer experience, and increasing cross-selling opportunities.
- **Enhanced Risk Management:** AI-based risk assessment models help banks in Bangladesh to more accurately assess credit risk, detect fraudulent activities, and manage non-performing loans. This improves their financial stability and competitiveness.

- **Cost Reduction:** Automation of processes through AI reduces operational costs, allowing banks to offer competitive interest rates and fees to attract and retain customers.
- **Data Privacy and Security:** The implementation of AI in banking has resulted to an increased focus on data privacy and security. Regulatory authorities in Bangladesh have adapted to include guidelines on data protection, cybersecurity, and the ethical AI implementation in banking operations.
- **Faster Transactions:** AI-driven technologies such as real-time transaction monitoring and instant fund transfers have significantly improved the speed and convenience of banking services.
- **Predictive Analytics:** AI enables banks to predict customer needs, identify potential issues, and offer proactive solutions, leading to a more satisfying customer experience.
- **Financial Inclusion:** AI is employed to extend banking services to underserved and unbanked populations in Bangladesh. Mobile banking apps and digital wallets, often powered by AI, provide easy access to financial services for a broader segment of the population.
- **Compliance and Reporting:** AI is used to streamline regulatory compliance and reporting by automating data collection and analysis, reducing the risk of noncompliance.

CONCLUSION

Artificial intelligence has had a remarkable effect on the banking sector in Bangladesh, as it has globally. The integration of AI in the banking sector also comes with obstacles, along with worries about data security, the ethical AI implementation, and the requirement for a proficient employees to manage AI systems. Regulatory authorities must strike a balance between encouraging innovation, and ensuring data privacy and security. AI has transformed the Bangladeshi banking sector by improving operational efficiency, customer service, competitiveness, and regulatory compliance. As AI continues to advance, banks in Bangladesh will need to adapt to remain competitive and meet evolving customer expectations while addressing ethical, and regulatory considerations.

Bangladesh has proved its significance on a worldwide scale technological field. Bangladesh can acquire a better position within the global economy by involving more AI integration in

the workplace and other activities. With the implementation of better and more effective strategies and useful steps in the application of AI to the various systems, Bangladesh can achieve more eco-friendly users.

Blockchain technology is capable of significantly transform the banking sector in Bangladesh. Although the incorporation of blockchain within the country's financial institutions is in its initial phase, there are several key reasons to anticipate its crucial role in reshaping the sector in the near future. The government, financial institutions, and technology companies need to collaborate and invest in blockchain solutions to unlock these advantages and reshape the banking landscape in Bangladesh.

While AI and robotics offer tremendous potential to enhance the banking sector in Bangladesh, banks must approach their adoption with caution and carefully consider the potential threats and challenges associated with these technologies. It is essential for banks to strike a balance between leveraging automation for efficiency and maintaining the human touch, ensuring data security and privacy, addressing algorithmic bias, and staying compliant with regulations.

Innovations are undeniably transforming the banking sector in Bangladesh, and the consequence of these advancements is already evident and promising. These transitions are leading to important advancements in the conduct of banking in Bangladesh. The ongoing innovations in the banking sector in Bangladesh have the capability to enhance financial services, making them more accessible, secure, and efficient, ultimately boosting the economic expansion and national prosperity.

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