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Risk Management of Islamic Banking in Bangladesh Integrating Artificial Intelligence: A Revolutionary Approach to Risk Detection and Management

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ABSTRACT

This study intends to comprehend the usefulness and prospects of integrating artificial intelligence (AI) in managing the risks of Islamic banking in Bangladesh and explore how to identify and manage these risks through AI integration in banking. This research is carried out using secondary data sources from annual reports, regulatory guidelines, journal articles, books, relevant organizations' websites, and organizational publications such as the Bangladesh Bank. The findings suggest that AI is essential for preventing risk and detecting fraud. The lack of regulatory provisions poses a substantial barrier to the adoption of artificial intelligence, particularly concerning data privacy and security, the availability of relevant expertise, and the development of an adequate IT infrastructure. Artificial intelligence (AI) has the possibility to substantially improve the competence and effectiveness of risk management in the banking industry. Although AI promises a variety of disruptive opportunities in the technological sector, including data acquisition, scrutiny, preventive, and consolidation processes, it also creates many kinds of threats to Islamic banks. It highlights the essential factors for recognizing the importance and potential obstacles in implementing AI technology, aiming to guide the utilization of AI in Bangladesh's Islamic banking operations.

Keywords: Artificial intelligence; Risk management; Cybersecurity; Islamic banking; Bangladesh.

1.0 INTRODUCTION

Islamic banking (IB) in Bangladesh has progressed promptly in value and market penetration and has been an essential division of the global banking industry. In conformity with global trends, it has experienced substantial prosperity because of robust public demand and supportive policies from the government and the Bangladesh Bank [1]. It holds immense potential; however, they are confronted with several obstacles, including an inadequate infrastructure, a shortage of a strong legitimate structure, indifference from the central bank, inadequacy of an Islamic capital market, and the unapproachability of Shari'ah literacy and particular awareness [2]. Scholars have regularly been concerned about these matters for preserving the interests of the desired people [3]. The emergence of artificial intelligence (AI) and the machine learning (ML) methods, a subsection of AI, that enable AI is causing a

significant shift in the field of financial risk management. These improvements have the potential to completely change how users understand and handle financial risk. Numerous possibilities for recognizing and managing risk have been made possible by the growth of AI-driven solutions [4]. This paper investigates the role of AI in addressing core concepts of the risk management such as risk detection, risk assessment, and risk mitigation of Islamic banks.

Risk managers are optimistic about the potential for further development of banking risk management by the application of AI and machine learning (ML). ML is a subcategory of AI. ML algorithms analyse data, extract information from it, and judge hinged on their expertise during machine learning. Deep learning (DL) is a Subcategory of machine learning (ML). DL is based on the human intellect system and work style. Multi-coated artificial neural networks pick up from massive data in DL [5]. Machine learning, recognized as a technology with significant implications for risk management, facilitates the development of more precise risk models by detecting intricate and nonlinear patterns within extensive datasets. The predictive capability of these models strengthens progressively as additional information is incorporated, thereby improving their accuracy over time. Furthermore, machine learning has been advocated as a strategic tool for transforming the risk management function within banking institutions [6].

Banks are generally susceptible to various risks, classified as either financial or non-financial. Credit risk, foreign exchange risk, liquidity risk, interest rate risk, insolvency and capital adequacy risk, and market risk are among the most common financial risks. Operational risk is the primary non-financial risk that banks encounter. Furthermore, IBs are prone to specific categories of risk due to their unique characteristics, including Shari'ah non-compliance risk, reputation risk, fiduciary risk, and asset price risk [7].

Islamic banking in Bangladesh faces various types of risks in its financial and operational forms. These are claimed to maintain their stability and enhance mastery in their operations. The risk management process is progressing and is typically ingrained in the overall environment of banks. The regular monitoring of these coincidental changes is essential for the identification of risks and the implementation of risk control measures [8]. Therefore, risk management is a set of interdependent aspects that balance and complement one another. The risk management process is an essential element of Islamic banking operations and should be implemented in all financial activities accomplished by the Islamic bank [9]. Thus, risk management starts with identifying risks and proceeds to building persistent and comprehensible measures for every risk. subsequently choosing from the risk mitigation procedures [10].

Effective risk management is essential for the growth of Islamic banking. This mechanism encompasses the identification, measurement, surveillance, and mitigation of risks analogous to Shari'ah principles [11]. In the latest financial climate, the requirement for progressive risk management has become plausible due to the confidence issue. They are concerned about this demand because Islamic banks are now a part of the global banking landscape [12]. The integration of AI will definitely facilitate and quicken the transaction service process for customers. For this, risk management is necessary due to the tough competition that is a aftermath of current globalization [13].

AI is becoming more significant in the economic, social, scientific, medical, financial, and military sectors [14]. However, AI has witnessed rapid advancements and serves as an instrument to alleviate the workload in a variety of industrial sectors, such as the financial and banking sectors [15]. Some stakeholders have been attracted by the possibility of AI applications in Islamic finance [16]. Hence, the Banking operations are being transformed by innovative technologies such as machine learning, predictive analytics, and natural language processing systems, as artificial intelligence (AI) becomes more central [17].

Accordingly, a bank requires accelerating a successful risk management strategy to attain long-term profitability and sustainable improvement. In the long run, it is compulsory to boost a more proper approach to risk-return in order to retain shareholder value, given the current challenges in the financial and economic atmosphere [7]. The competence of banks to manage diverse sorts of risk is an essential element in their survival and success. Therefore, RM is a critical ingredient in safeguarding that shareholders of institutions obtain significant returns [18], avoiding economic adversities and assuring feasible performance [19].

In this paper, we will focus on the use of AI in financial institutions, especially in Islamic banks, in Bangladesh. It also discusses in which areas AI is being integrated into the operations of the IB industry. In the following section, we present the purpose of the study, problems embedded with the AI implementation, a review of the previous literature, AI applications in IB risk management, and the challenges of integrating AI in the IB industry.

2.0 PURPOSE AND SCOPE OF THE STUDY

This study aims to analyse how AI is used to identify risks and face their underlying challenges. Therefore, measures need to be taken to manage the risks using AI. This paper intends to review the facts of AI utilization that have been materialized in the Islamic banking industry in Bangladesh to comprehend AI application in the actual banking environment, to provide safeguards against risk and irregularities in the operation. It explores the implications of AI in risk management and fraud identification in Islamic banking, and the challenges and future trends in this dynamic arena.

3.0 STATEMENT OF THE PROBLEM

The shift from experimentation in specific use cases to the extensive implementation of AI technologies has challenged numerous institutions. Due to the lack of a precise AI strategy, a rigorous and anti-investment technology, remnant data assets, and old-fashioned operating systems that obstruct the combination between business and technology units [20]. Notwithstanding, the banking sector is in the spotlight of the uncontrollable dispute against mounting cybersecurity challenges in an era focused on upgraded digital connectivity. The banking organizations face significant challenges in preserving sensitive customer data, securing transactions, and impeding misleading actions as a result of an ever-expanding reliance on digital platforms [21]. Moreover, its integration creates massive hurdles, particularly in the fields of ethics, regulation, and data security [15]. There are plenty of obstacles to integrating AI technology in the banking industry, despite the attractiveness and implications of AI technologies. This is mostly due to consumers' inadequate understanding of AI technology [22].

4.0 METHODOLOGY

The study focuses on the implementation of AI in risk detection and management in Islamic banking in Bangladesh. This article delves into the Artificial Intelligence implications in IBs in Bangladesh using a secondary data collection approach. Data collection includes annual reports, regulatory guidelines, journal articles, books, relevant organizations' websites, and organizational publications such as the Bangladesh Bank and the IMF. According to Johnston [23] Secondary data analysis is the review of data that was initially gathered by another individual or organization for another primary objective. The use of already collected information provides a practical solution for researchers with scarce resources and time.

5.0 LITERATURE REVIEW

Artificial Intelligence has been adopted for a few years in the banking sector of Bangladesh to preserve stakeholders' interests as well as the security of bank transactions. Islamic banking brings a sustainable financial system to Bangladesh. Banks, especially Islamic banking, are presently taking steps to implement Artificial Intelligence to uphold the interests of the customer. Islam et al [24] examine the usage of AI and its influence on the performance of trades in Bangladesh by analysing the prevailing literature and elementary data analysis. The

results depict that the implementation of AI in ventures may have a substantial positive effect on production, cost, efficiency, decision-making, fraud detection, and supply chain optimization. Nevertheless, the deployment of AI is hindered by a lack of expert personnel, insufficient data quality, financial constraints, infrastructure, and legal frameworks.

PwC projected that AI would make a cumulative contribution of USD 17 trillion to the global economy by 2030 [25]. IMF research (2023) editorial by [26] demonstrates that AI is transforming the financial industry through automating tasks, developing risk management, and strengthening decision-making mechanisms. For instance, AI algorithms are employed in banking institutions to ensure regulatory compliance, detect misconduct, and process credit card applications. AI has an impact on biometric authorization, and for the people who prefer infrequent visits to a physical bank [27].

Bangladesh and global financial AI applications have been investigated and explored, and it has been found that AI is employed to save time, minimize costs, and create value via quicker assistance. AI can automate tasks, decrease psychological or emotional errors, and upgrade management information through identifying patterns or long-term trends that existing monitoring systems [28]. It focuses on the prerequisite of the government to have extensive planning to effectively incorporate AI technology, which entails directing issues related to policy, information privacy, security, and regulations [29].

The greater accurate machine learning algorithms, such as Logistic Regression, Random Forest, and Decision Tree, can accurately forecast customer satisfaction with internet banking in Bangladesh, with the highest accuracy of 96% [30]. However, the materialization of internet banking in Bangladesh has been largely developed by AI and ML, which improves security, user experience, and customer confidence. Furthermore, banking services are customized and operations are simplified by AI-powered solutions, comprising chatbots and fraud detection systems, which address concerns regarding user convenience and cybersecurity [31].

Harun et. al [32], adopting a qualitative research study, determined that AI can enhance effectiveness and expertise in Islamic banking activities. Participants expressed doubts over AI's ability to take on human labour in particular areas. The joint application of AI might aid decision-making in Islamic banks. Islamic banks face challenges in implementing AI while sticking to Islamic guidelines.

In Bangladesh, a system application of AI to identify unusual digital transactions could resist corruption by inspecting financial transactions. This mechanism will attain and preprocess banking transaction data to find out incongruous operations by applying data clustering. The study highlights the importance of cybersecurity, infrastructure, and digital literacy for a secure and inclusive automated banking [33].

Applying a literature review methodology, the research revealed that the application of AI in Bangladeshi banks considerably strengthens the risk management and fraud identification capabilities. AI enhances the technique of evaluations by detecting distinct patterns in gigantic datasets, thereby simplifying the development of precise credit risk assessment models [34].

The banking and financial corporations are being revolutionized by AI, which is reformulating operations and fortifying customer experiences through ingenious products and services. It is forecasted that AI technologies will supplant human roles, thereby offering more modest and dynamic services. In such a way, the finance sector's competitive preference is hinged on the adoption of AI [35]. The study managed by Putri & Suryanto [15], applying a qualitative descriptive approach, reveals that AI enhances banking risk assessment accuracy and momentum, enabling quick detection and complicated predictive modelling. However, data security, Shari’ah compliance, and flexible rules make AI in banking risk management difficult.

Through a systematic literature review, ARABI [36] found that the integration of AI into Islamic banking covers regulatory, technical, and organisational impediments. Islamic banks can enhance viability and efficiency with AI. Its usage in Islamic banking requires Sharia compliance. To leverage AI benefits, employees necessitate strong compliance procedures and regular training.

AI is important for the prevention of risk and the identification of fraud in banking operations. Data privacy, regulatory obligations, security, and inadequate IT infrastructure are among the most serious obstacles [22]. As a study, the purpose of integrating AI technology in the banking sector was positively influenced by factors including attitude, awareness, perceived utility, subjective norms, and the wisdom of AI technology [37]. Therefore, AI applications in banking may accelerate productivity and reduce costs, adding value to firms. Research identifies that it can lessen emotional mistakes and enhance management information accuracy [28].

AI and ML revamp operational efficiency and client experience in the financial industry. It implies moral concerns, algorithmic bias risks, and data privacy challenges. The extension of AI in trading may add to market volatility and interrelation among financial markets [38]. In banking, the adoption of AI may be hampered by cybersecurity concerns and regulatory measures, despite its widespread potential benefits. The banking sector's automation of AI has remained modest, stressing the necessity of rapid adoption to enhance profitability [39]. It is possible for AI technology in fintech to develop banking; however, this demands effective regulatory oversight to ensure favourable results [40].

6.0 APPLICATIONS OF AI IN RISK MANAGEMENT OF ISLAMIC BANKING

Artificial intelligence (AI) is expanding as an increasingly influential technology in the financial arena. It is implemented to enable both customer-facing applications and domestic operations. Consequently, banks are updating a variety of functions in the front, middle, and back office, such as fraud detection, regulatory compliance, wealth management, and customer service [41]. AI and ML are adopted for operational risk management, and a group of related risks has gained significant results in anti-money laundering, fraud prevention, and cybersecurity in the global context [5]. AI-driven predictive analytics has become a dominant device that enables financial professionals to make informed decisions, identify risks, and anticipate trends with extraordinary speed and accuracy. In banking, predictive analytics requires the application of machine learning algorithms and statistical methods to scrutinize historical data and give predictions for future events [42]. Hence, AI empowers data-driven decision-making across a variety of functions by providing banks with sophisticated analytical capabilities and predictive modelling tools [43].

6.1 Risk Management

AI is disrupting financial risk management by optimizing techniques of risk identification, assessment, and mitigation through machine learning, natural language processing (NLP), and predictive analytics. AI-driven models boost predictive effectiveness, automate risk assessment, and facilitate decision-making where traditional approaches struggle with scalability and real-time analysis. AI progresses fraud detection by detecting irregularities, expands market risk modelling through sentiment analysis and forecasting, and enables automated compliance monitoring [44]. In risk management, AI-driven predictive models, encompassing decision trees to deep learning architectures, empower banks to spot potential credit risks, market swings, and liquidity shortages. Banks are more efficiently prepared to mitigate systemic risks and ensure stability in a constantly shifting financial ecosystem by utilizing structured financial data together with unstructured market information [45]. Know Your Customer (KYC) procedures enable financial institutions to apply automatic facial recognition and document analysis technologies to locate customers efficiently and successfully. Customers can upload a document’s photograph and selfies during registration via a mobile application, and AI checks the data and genuineness of the documents, by which results in a verification process that is free from errors and minimizes the risk of fraud [46].

Banking products are the most advanced part of Islamic finance, including credit contracts, online payment contracts, stock trading contracts, and payment transaction contracts. These contracts are administered by various methods of Islamic finance, such as Murabaha and Musarakah contracts, and are subject to Shari'ah principles [47]. However, Islamic banking necessitates strict obedience to Sharia law, which prohibits interest (riba), high uncertainty (gharar), and unlawful finance. Hence, AI-powered algorithms can detect non-compliant components by analysing contracts and financial transactions [48].

Artificial intelligence can automate Sharia-compliant financial products, including istishna (project financing), tawarruq (commodity-based funding), and murabaha (cost-plus financing), endorsing that these transactions follow Islamic tenets like the prohibition on riba (interest) and gharar (excessive uncertainty). AI-powered solutions can also help with real-time Shari'ah audits, which allow Islamic banks to keep an eye on transactions to make sure they stick to Shari'ah guidelines [49]. In Mudarabah investing with the concept of profit-sharing (PLS), AI can accelerate the financing distribution process in hours. It will deal with the next step when the customer fills out the form at the bank. The sort of business of the expected customer, whether it sells and buys alcohol, meat, pork, pornography, gambling, prostitution, or other areas that are forbidden by religion, may assist in predicting financing risks. By looking at economic statistics about the customer's firm, AI can estimate its future potential [50].

In Islamic banking, successful risk management is achieved by keeping financial strength, sticking to Shari'ah principles, and bolstering trust and credibility. Islamic banking's principles need adherence to Shari'ah laws, which create distinctive obstacles to the adoption of AI technologies. However, artificial intelligence can maintain compliance by automating the mechanisms and improving the risk assessment capacities [51].Therefore, the transaction service procedure for customers will undoubtedly be facilitated and simplified by the operation of AI in the banking industry [13]. AI intensifies service efficiency and cost savings by driving business model innovation, promoting customized digital finance, and improving customer relationships. It is anticipated that the adoption of AI in finance will provide financial institutions with a competitive edge by enhancing risk management, automating execution, and reducing costs, thereby improving profitability and increasing efficiency [38].

6.2 Risk Detection

Banks have traditionally relied on conventional rule-based detection mechanisms. However, these systems often fail against dynamic threats operating with stagnant parameters. Whereas AI offers context-aware, dynamic, self-learning mechanisms that constantly evolve, responding to novel attack tactics [52]. Modern banking systems execute millions of micro-payments and transfers every day, generating intricate data flows that are impossible to identify manually. Trained with past fraud cases, AI can detect anomalous trends with outstanding accuracy. Deep autoencoders or gradient boosting machines, for example, can detect transactions that deviate from normal spending trends. Unsupervised learning algorithms, including density-based detection and clustering, can detect irregularities without prior labelling them as "zero-day" scam efforts. Deep recurrent frameworks, such as Long Short-Term Memory (LSTM) networks, identify minor periodic irregularities in customer behaviour [53]. Behavioural biometrics and device intelligence strengthen safer digital transactions beyond anomaly detection. Behavioural biometrics investigates dynamic user-oriented activities, such as typing rhythms, touchscreen pressure, navigation trajectories, and habitual geolocation patterns, contrary to static credentials comprising PINs or passwords. These are put together to generate specific behavioural signatures, which are difficult to counterfeit. Banks enhance multi-layered verification systems that guarantee robustness and customer satisfaction when combined with device-specific clues such as IP fingerprints, SIM identifiers, and hardware signatures [45].

6.3 Risk Assessment

The advent of AI has brought about an entirely novel paradigm of risk assessment. AI technology can analyse extensive datasets, adjust to new patterns, and provide more nuanced predictions. This adaptability allows them to be especially well-suited to environments featured by uncertainty, systemic interdependence, and large amounts of real-time data. AI techniques have been implemented in the banking industry across the full spectrum of credit risk, market risk, liquidity risk, operational risk, and systemic risk, providing both predictive power and prescriptive guidance [54]. AI has strengthened enterprises to undertake more in-depth and precise risk assessments. Deep learning algorithms and neural networks are able to detect nuanced patterns and connections among different risk variables that may not be accessible through commonplace analytical techniques. Modern technology has made it possible to predict the potential of risks and their probable impacts, which is necessary for tactical planning and prudent decision-making [46]. Hence, Machine learning algorithms provide the foundational structure of AI-based risk assessment. Decision trees, Random forests, and Gradient Boosting Machine (GBM) have demonstrated themselves as extremely effective techniques in credit risk modelling, outpacing the precision of traditional scoring models. These models harness the acquisition of nonlinear relationships among borrower demographics, transactional histories, income levels, and behavioural patterns to reduce false positives in default prediction and improve risk-adjusted lending decisions [55].

6.4 Risk Mitigation

Artificial Intelligence is applied to mitigate the risks faced by banks, enabling them to detect and prevent fraud. Lion & Ekefre [56] investigated that in recent years, growth in artificial intelligence (AI) has delivered innovative solutions to improve the risk management practices of the banking industry. According to Moore [57] AI reduces risk by detecting and preventing fraud. Financial institutions are at risk from identity theft, money laundering, and cyberattacks. AI-powered systems recognize fraud patterns and behaviours, allowing banks to act quickly. AI systems may assess transaction data to identify questionable consumer behaviour, improving the bank's fraud prevention.

AI and machine learning contribute to increasing operational efficiency and upgrading the customer experience. Technology enables the automation of risk management strategies, particularly in the field of credit scoring. The integration of machine learning algorithms to effectively evaluate massive datasets assists in mitigating credit risks, locating fraudulent transactions, and promoting intelligent financial decisions[46]. The anomaly detection algorithms employ machine learning techniques, incorporating clustering models and deep neural networks, which analyse customer transaction patterns, considering criteria such as transaction amount and frequency, geolocation, and previous transaction history. They can identify intricate fraud strategies that conventional systems may not detect. In particular, if an operation is initiated from an atypical location or if there is strange activity at night, the system can suddenly stop the transaction and ask for confirmation from the customer [58]. However, Fraud prevention techniques entail multifactor encryption and the utilization of biometric authentication to verify the customer identity, along with a behavioural biometric method that examines specific patterns of customer engagement with a mobile application, such as typing velocity and mouse movements. These safeguards mitigate unauthorized access risks and improve the economic security at the micro level [59].

6.5 AI in Risk Management of Islamic Banking in Bangladesh

AI is changing the investment patterns of the banking industry in Bangladesh. For instance, robo-advisors adopt algorithms to instruct and handle investments. These platforms gauge financial ambitions, investor risk endurance, and market settings to customize investment procedures (Rahman, 2024). According to the Bangladesh Institute of Bank Management (BIBM), AI-based banking applications can improve expertise, cut expenditures, and enhance service quality. Moreover, AI uncovers unknown data trends, aiding fraud detection and risk management (Khan et al., 2021). Therefore, Bangladeshi organizations are gradually

integrating AI to enhance services and vitalize economic development, as they are also embracing this AI trend [62]. Artificial intelligence assists in making Islamic banks more efficient and customer-focused. Using AI and Machine Learning, at first, Abu Dhabi Bank, as an Islamic bank, launched a merchant gateway for advanced data analytics. Emirates NBD has also partnered with Copilot X to improve coding and software development [63].

In recent years, dramatic developments in Bangladesh's banking sector have been caused by digital technology. An increasing mobile user base and a government program like Digital Bangladesh make AI-powered banking solutions possible. The Bangladeshi financial ecosystem is obtaining customized AI applications, from customer care chatbots to fraud detection algorithms. AI-powered chatbots, for instance, are being employed by financial service providers and banks to respond to recurrent customer inquiries. These are available 24/7/365 and can facilitate clients with a variety of duties, including the description of financial products and checking of account balances. This eradicates the burden of human customer service assistants and extends the comfort of services for customers, who usually struggle to visit a bank branch [60].

Islami Bank Bangladesh PLC (IBBPLC) is using AI in banking services. It has implemented AI-powered chatbots and virtual assistants that can respond to banking products, account balances, transaction history, and customer inquiries 24/7, enhancing customer service. By using machine learning, IBBPLC can improve its operational efficiency, Shari'ah-compliant financial transactions, risk identification, and mitigation [51].

Al-Arafah Islami Bank PLC has applied fintech to enable finance to be more accessible. The bank is linking its mobile services to bKash and Nagad to facilitate cross-platform fund transactions. Customers are capable of opening wallets remotely with e-KYC and biometric authentication from the bank [64].

Social Islami Bank (SIBL) Bangladesh offers a comprehensive digital onboarding efficiency that streamlines and expedites the onboarding process for customers, while also improving the customer experience to align with the contemporary lifestyle. The solution incorporates multi-layer authentication and AI-powered optical character recognition to get data from the national ID [65].

Furthermore, numerous instances of Islamic financial institutions, including online Islamic banking, Islamic insurance (e-Takaful), charity sector, endowment (e-Waqf), Islamic levy (e-Zakat), and other Islamic financial institutions, have arisen in recent years in both Muslim and non-Muslim countries [47]. Stakeholders in Islamic finance have publicly expressed their optimism regarding the potential of artificial intelligence to enhance productivity and efficiency within the industry [32].

In the Bangladeshi banking sector, the four most critical factors that form the foundation for a successful AI application are technology, personnel, legislation, and data. A survey found that 45% of banks believe that market competitiveness is a compelling element in regulating the level of AI preparedness [43]. It is obvious that AI has the potential to be extensively applied in the broader domain of cybersecurity. Additionally, banks are employing AI-based applications for regulatory compliance and reporting purposes (Khan et al., 2021). Table 1 illustrates the AI products used by the Bangladeshi banking sector to promote their operations in line with the functional domain of banks.

According to BIBM research, the Robotic Process Automation (RPA) solutions are being implemented by banks in a variety of applications, including cash counting, vault administration, data centre management, and KYC assessment. RPA can be employed by banks for a variety of other purposes, including customer service, account opening, report automation, and credit administration (Khan et al., 2021).

Table 1: Functional Areas of Application of AI in Banks (Khan et al., [61])

Functional areas of Banks	Product's Name
Business Analytics	No Product
Executive Support Systems (ESS) and Decision Support Systems (DSS) for the quick and right decision-making of Top Management	- Selenium - Pubali Monitoring System (PMS)
Business Operation	ROBO2, NID, and Face Verification for A/C Opening, Cloud Vision API from Google
ADCs Operations/Services	- ADC Apps - ATM Switching Software
AML and CFT Issue	- 3S - Transaction Monitoring Software - Pubali Monitoring System (PMS)
Financial Risk Analysis	Risk Analysis
Cyber/IT Risk Analysis	- SIEM -Check Point Next Generation Firewall - Securex
Cyber Fraud Detection and Prevention	- McAfee – FIM (file integrity monitoring) - NGFW - IBM Qradar SIEM - Securex
e-CRM (Customer Satisfaction, Relationship, and Retention Plan)	No Product
Regulatory Compliance/Reporting	- Selenium - goAML and CIB -Transaction Monitoring Software

BIBM observed that a substantial number of institutions (46%) reported employing AI for automated threat hunting. This method entails the utilization of machine learning algorithms to identify and react to probable cyber-attacks in real time, thereby improving the efficiency of the threat detection and mitigation processes. Despite the potential of AI to revolutionize the financial industry, the successful implementation of AI necessitates the careful consideration of foundational issues such as data availability, cybersecurity, error-free data, and a robust infrastructure (Khan et al., 2025). In addition, Artificial Intelligence has become the centre of researchers, practitioners, and policymakers in the Islamic banking industry to ascertain how technological advancements can assist financial services[47].

Bangladesh Bank has recently initiated industry-specific AI guidelines to improve governance of digital finance, customer safeguarding, and financial stability. At a policy seminar, the Bangladesh Bank unveiled a detailed plan for the integration of AI into the financial sector, forming a dedicated seven-member AI specialists committee to monitor algorithmic banking operations and financial transactions. The framework will ensure to protect customer rights, mitigating algorithmic risks, expanding cybersecurity protocols, and fostering transparency in automated decision-making that are gradually reinforced by international financial institutions and regulators [66].

7.0 CHALLENGES OF IMPLEMENTING AI-BASED RISK MANAGEMENT

The bank should stay away from integrating AI or automation beyond the regulatory parameters, even though there is potential for better outcomes through their implementation. Banks must think about the long-term return on investment of AI and robotics. The banking sector involves numerous risks and dangers related to AI, including difficulty with interpretability, ingrained prejudices, limited focus, compatibility issues with other systems,

which banks must meticulously evaluate before integrating AI solutions into their system (Khan et al., 2021). Despite the potential benefits of AI, there are some drawbacks to integrating AI in Islamic banking in Bangladesh. The challenges affect the consumer's perception and banking operations when dealing with automated banking services.

7.1 Data Privacy Concerns

The financial services industry of Bangladesh attempts to consolidate AI. Data privacy and security are substantial issues. Banking industries are progressively applying AI-driven analytics, escalating the risk of data leaks and individual data exploitation. Another issue is infrastructure, especially in rural areas where internet access and digital literacy are low [60].

7.2 High Implementation Costs

Integration of AI requires a vast investment, which may deter the smaller Islamic banks [32]. Even though banks own a strong foundation in technology and data administration, they still suffer from inadequate strategic vision, external engagement or collaboration, and workforce development deficiencies (Khan et al., 2025).

7.3 Lack of Skilled Workforce

A significant shortage of AI skilled professional exists in the financial sector. Investment in employee training or collaboration with technology companies is necessary for banks to improve AI capabilities.

7.4 Technology Integration

The adoption of AI with existing legacy systems can be complicated and may require considerable investments in technology advancements. Qualified personnel who have expertise both Islamic banking principles and AI technology are needed [32].

7.5 Shari'ah Compliance

The meticulous design and oversight of AI algorithms by Shari'ah scholars and experts are essential to prevent them from inadvertently violating Shari'ah principles. It is necessary that the integration of AI is consistent with Islamic ethical principles, which prioritize fairness, transparency, and the prohibition of illegitimate gains [32].

7.6 Lack of Proper Policy

The absence of an AI strategy or policy in the majority of banks analysed revealed that the banking industry is a typical user of the adoption of AI technologies. This lack of acceptance can be attributed to a variety of factors, but the most prevalent ones include financial constraints (budget constraints), regulatory ambiguity, concerns regarding privacy and data security, and a lack of proper knowledge and awareness (Khan et al., 2025). The most harmful uses of AI in banking include security vulnerabilities, algorithmic errors, limited features, risks associated with entirely automated loan approvals, privacy violations, biased algorithms, and a lack of transparency and explainability [67].

7.7 Cybersecurity Issues

Cybersecurity issues are increasingly appearing. The challenges caused by digital banking threats to Islamic banks and their numerous customers. Islamic banks, transforming into digital platforms for the sake of economic inclusion and adhering to Shari'ah rules, need to maintain ethical standards in finance. For example, the interest-based operations that are mainly prohibited must also tackle digital transformation risks, such as ransomware, fishing and fraudulent activities. The Bangladeshi banking sector has become highly prone to cybersecurity challenges such as data leaks, fraud, and cyberattacks, which endanger customer faith and the integrity of the banking system [68].

8.0 CONCLUSION

In order to reap the benefits of the revolutionary and automated systems within the framework of digital transformation, banks should implement AI and RPA in both front-end and back-end operations and procedures. In the meantime, Artificial Intelligence has turned into the central point across global finance and an optimistic future in Islamic Banking. It depicts the avenue to preserve customers' privacy and security, which requires formulating strong data protection regulations to protect consumers' privacy and safety. The adoption of AI in banking has brought trust in customers' minds in many cases, strengthening customer data protection from fraud and cyberattacks. Therefore, AI is applauded for achieving a shield against protecting data security and reliability.

Effective risk management is important to the stability and expansion of Islamic banking in Bangladesh. The risk management in Islamic banking through AI algorithms by addressing the unique risks associated with Shari'ah-compliant financial activities requires a thorough approach that encompasses developing regulatory frameworks, enhancing risk identification and assessment practices, raising awareness and training among bank personnel, and ensuring strong Shari'ah compliance mechanisms.

In the future, banks will likely advertise their AI integration and how they can expand advances more quickly than competitors. AI will assist banks in implementing new operating models, streamlining workflows, modernizing and automating, and sustaining profitability in a new commercial and retail banking era [41]. The banking industry will increasingly depend on automation, predictive analytics, and machine learning as artificial intelligence progresses to hone its services [48]. The future of trustworthy banking hinges on user authentication. Because it is based on each person's distinct bodily characteristics, biometric verification delivers a potent remedy. AI moves beyond this by enhancing and promoting technologies such as voice recognition, fingerprint scanning, and facial recognition [69].

Therefore, Artificial Intelligence has already brought revolutionary change in customer service through the use of conversational interfaces and chatbots to help customers make essential calculations and evaluate budgets quickly. It may bring change in functional security management of the banking industry with the disappearance of passwords, usernames, and security questions, guaranteeing that their clients' data is protected[70].

CONFLICT OF INTEREST

No conflict of interest

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