SPCRD GLOBAL PUBLISHING
Sustainable Solutions
RAMSS Review of Applied Management and Social Sciences
Journal homepage: http://ramss.spcrd.org ISSN (Print): 2708-2024 ISSN (Online): 2708-3640

Use of Artificial Intelligence in the Banking Industry: A Case Study of Pakistan

[a] Nayyab Zulfiqar, [b] Faizan Ghafoor, [c] Muhammad Idrees, [d] Kashif Raza

[a] Master of Business Administration, University of Central Punjab, Pakistan
E-Mail: nayyabzulfiqar15@gmail.com
[b] PhD Scholar, Department of Business administration, Cyprus International University, Cyprus
E-Mail: ghafoorf640@gmail.com
[c] Department of Management Sciences, The Islamia University of Bahawalpur, Pakistan
E-Mail: muhammadidrees0121@gmail.com
[d] Lecturer, Department of Economics, The Islamia University of Bahawalpur, Bahawalnagar Campus, Pakistan
E-Mail: kashif.raza@iub.edu.pk

ARTICLE DETAILS

History:
Accepted 28 October 2024
Available Online November 2024

Keywords:
Artificial Intelligence, Pakistan Banking Sector, Customer Service, Fraud Detection, Operational Efficiency, Data Privacy, Automation Challenges, Regulatory Compliance

JEL Classification:

DOI: *10.47067/ramss.v7i4.394*

ABSTRACT

This study investigates the adoption and impact of Artificial Intelligence (AI) in Pakistan's banking sector, with a focus on Habib Bank Limited (HBL), Faysal Bank, and Bank Alfalah. The objective is to understand the extent to which AI technologies have transformed core activities within customer service, operations, fraud detection, and risk management in these banks. Data were collected from semi-structured interviews with ten respondents, selected based on their experience with AI implementation. This qualitative methodology allows for in-depth insights into the functionality and challenges associated with AI in banking. Results reveal that AI has notably improved operational efficiency by streamlining risk management and enabling real-time fraud detection. Additionally, AI-driven chatbots and virtual assistants have enhanced customer experiences by offering faster and more personalized services. Despite these benefits, the study identifies significant challenges, particularly regarding data privacy and regulatory compliance, as well as the need for human resources to adapt to AI-enabled tools. Key pressures in the industry include building capabilities to work alongside AI while addressing concerns over automation. To maximize the advantages of AI, the study emphasizes the need for comprehensive policies that balance technological adoption with ethical considerations, data security, and staff training. Strategic planning in Pakistan's banking sector will be crucial to harnessing AI's potential while managing its risks.

© 2024 The authors. Published by SPCRD Global Publishing. This is an open access article under the Creative Commons Attribution-NonCommercial 4.0

Corresponding author's email address: kashif.raza@iub.edu.pk

1. Introduction

Modern artificial intelligence (AI) has significantly changed over recent decades across industries as it has revolutionized processes making them automatic, decisions enhancing operations, and all-round organization efficiency. AI has also been adopted in the banking sector making massive impacts in innovations of customer relations, frauds, risk, assessment and control, and in the general banking operations. Maseke (2024) highlights that with development in AI; more institutes are using the AI approaches like machine learning, natural language processing, robotic processing automation in banking and finance. These technologies have helped the banks process extensive data, do repetitive jobs, and offer services tailor-made to customers.

AI around the world has helped transform the operational strategy of banks regarding whether the risk assessment is deep and detailed in decision-making by cutting costs. For example, through AI technology in the development of chatbots and virtual assistants, more efficient customer interaction has been achieved due to the provision of round-the-clock service. In the share of a developed economy, the crucial application of AI has been observed in fraud detection, in which, using a machine learning approach, the transaction behavior pattern is analyzed and scrutinized for any abnormal activity identified by Javaid (2024). However, as we have seen, with every opportunity that AI brings comes a pack of problems ranging from data security issues to workforce replacement. Again, as AL-Dosari et al. (2024) posit, other challenges include ethical concerns and cyber risk, which are also looming barriers, given that FI is heavily implementing AI.

The banking sector of Pakistan, though expanding at a reasonable rate, has specific problems associated with it, such as ineffective mechanisms, specific regulation policies, and, above all, the process of considering modernization. As a developing economy, Pakistan has always been a slow adopter of advanced technologies, but the need for innovation is emerging. Following Nawaz et al. (2024), the banking sector of this country has remained relatively immature in implementing sophisticated technologies such as artificial intelligence because of restricted infrastructural development, strict government rules and regulations, and inadequate capital investment in digitization. As competition increases, especially with the emergence of FINTECH organizations, regular banks within Pakistan are starting to appreciate AI's position on improving their services and competitiveness.

Several reasons have fueled the demand for Technological advancement in Pakistani banks. First, there is pressure from customers who expect organizations to deliver their services more quickly, competently, and tailored to their specific needs. Second, the threats of cyber-attacks and fraud have emerged; therefore, there lies the necessity to develop AI to enhance cyber security mechanisms (Iqbal et al., 2024). Third, tactical misalignments comprising ineffective systems have compelled banks to embrace AI to solve operational challenges. In the traditional banking system, Naeem et al. (2024) observed that AI can increase the banks' efficiency by efficiently managing the processes, triggering customer satisfaction, and cutting expenses. Still, there are those opportunities the banking sector in Pakistan needs to grab. However, it needs help with issues like data privacy or workforce introduction to AI technologies.

It is essential to discern how AI impacts the country's banking industry since Pakistan is a developing economy with particular challenges. Unlike other regions in the world where banking adopts AI, the banking sector of Pakistan is still young in adapting to the technology. In their study 'AI Use Cases in Banking Industry,' Ahmed et al. (2024) stress that AI must be explored for the Pakistan banking industry as this technology holds promise for strategic industry issues, including inefficiencies,

fraudulent activities, and dissatisfied customers. Still, the integration of artificial intelligence is accompanied by issues such as data and privacy and the displacement of the workforce and compliance, which is a significant issue in countries such as Pakistan, which is still in the developing status.

Since the banking sector has significant significance in overall economic development, it is essential to understand how artificial intelligence works for businesses in Pakistan. Looking at the current trend towards more significant development of digital banking and the need to integrate new solutions into the work of companies, it is crucial to determine the strengths and weaknesses that exist in the application of AI. Moreover, it is equally essential for bank employees' perspectives on adopting AI to examine the probable resistance factors and the work in progress of the aspects that might need improvement in training and skills improvement.

Therefore, this research mainly concerns using AI in Pakistan's banking sector and its effects on business performance. This research targets the three central banks of Pakistan in the context of this study, Habib Bank Limited (HBL), Faysal Bank, and Bank Alfalah, to investigate how customer services, fraud detection, risk management, and operational efficiency are shaping up through the applications of artificial intelligence. In addition to outlining the cost and benefits of AI in banking, the research also discussed implementation barriers, decision-making factors such as data privacy and security, and employees' resistance to change.

The findings of this research are beneficial for investment-oriented banks, government authorities, and other stakeholders in the financial services sector of Pakistan. According to Liu et al., 2024, advances in Information Technology, especially AI, need to be adopted in the banking systems to enhance efficiency in developing countries. To the banks, it is essential to know how AI can increase capital efficiency, improve customer experience, and reduce risks to remain competitive in a more digitalized economic environment. Organizations, including progressive banking operations, could benefit from applying advanced information technologies like predictive analytics and fraud-detecting systems.

Policymakers also found the results of this valuable research helpful in understanding the compliance difficulties when implementing AI solutions. As highlighted by Farooq and Pervez (2024), applying AI in banking is essential to address the connected problems associated with analytical data protection, cyber threats, and ethical matters. The present study's findings can help policymakers identify the processes that need to be put in place to build the necessary favorable context for AI advancement, but at the same time, to protect customers' rights and meet the obligatory global requirements.

To industry players in a broader sense of financial services, this study can be used as a reference guide on using AI technologies. According to Choithani et al., AI is disrupting the banking industry and the entire financial system, including Fintech, insurance, and investment services. Overall, this study adds to the body of knowledge regarding the practical application of intellectual technologies in Pakistan's banking industry and how AI implementation may help pull off innovation in the company and the overall Financial Services Division.

Besides, this study gave additional information about the attitudes of bank employees toward AI implementation. Ahmed and Ramish, in their survey investigation, anticipated that during the period 2020– 2024, AI is poised to be the game changer in determining the future of HRM practices in the business setting of Pakistan. This paper examines how employees approach AI and provide

recommendations on how banks can address resistance against AI innovations.

The present study on the uptake and effects of artificial intelligence in the Pakistani banking sector is valuable in identifying the potential of technological solutions to meet existing problems in the field. To that end, this research examines AI implementation's opportunities, risks, and perceptions. It seeks to offer valuable suggestions for banks, governments, and the overall financial sector to address issues and harness the potential of AI.

2. Literature Review

2.1 Global Adoption of AI in Banking

The application of Artificial Intelligence (AI) in additional banking practices has changed conventional practices in recent years by improving organizational performance, customer satisfaction, and risk management. In their first research on the impact of AI in banking across the world, Waleed et al. (2023) their work even identified technologies like big data analytics, customer prediction through ML and natural language processing through chatbots, and fraud detection tools as some of the critical success factors of artificial intelligence in banking. Data analytics, for instance, help banks analyze large and significant amounts of customer data in the bid to make better decisions as well as to segment customers accurately. In addition, through artificial intelligence techniques, the banks have also been able to grouped customers in terms of preferences, risks and behavior so as to facilitate provision of well fitted services. All in all, more refined client categorization leads to better and long-term customer relations through product and services offer customization by usage of ML. Furthermore, for business where real-time, high volume customer queries are received then chatbots/virtual assistants provide enhanced solutions to scale up customer service challenges during high traffic periods thereby increasing the value for customers.

Javaid (2024) has further stressed Waleed et al., (2023) work and covered the positions of specific applications of AI in fraud detection, including the importance of pattern recognition techniques. Javaid states that financial sector has gotten lot of benefit from AI especially in terms of quickly and efficiently auditing transactions. The AI system of fraud detection uses algorithms to scan large data for signs of fraud that deviate from the usual received levels, transaction locations, or times. They proposed that through the integration of AI in banking, banks can be able to identify potentially fraudulent transactions on real time basis thus considerably minimizing on the amount of loses by customers' accounts. Javaid's evidence also shows that not only does AI increase the efficiency of the particular process, but also, it increases the efficacy of the particular process by which banks may reduce their exposures to particular risk.

Building on AI's customer service applicability, Cavaye & Oldfield (2024) explored how virtual assistants help simplify the burden on human agents in terms of working through various customer contexts. These AI implemented tools respond to many customer needs and the clients always get banking help without the operating hours limitations thus improving satisfaction and loyalty. Virtual assistants can answer brief questions barring any delay enabling live agents to provide support for scenarios that need personal touch, creativity or time intensive tasks hence enhancing overall customer service management.

Finally, Pattnaik et al. (2024) analyzed how AI is used in banks using machine learning so that the bank can recommend products and services that suit the clients' tastes. They pointed that the analysis of spending and parameters of behavior which ML algorithms are capable of can forecast products or services which might be interesting to the customer, ranging from credit to investment

services. The use of personalization also helps banks revisit the concept of customer loyalty since customers feel like the products being offered are those they would want personally. This study led Pattnaik et al. to determine that customer segmentation makes the banking sector viable in the developed as well as the emerging markets, in which AI-enabled strategies play a significant role in achieving competitive benefits as well as the customer loyalty brought about by the digital competition. In combination with each other, these papers offer a rather broad look at how AI transforms banking at its core of contemporary finance as a durable and impactful force.

2.2 Risks and Challenges in AI Adoption

There are a number of limitations, concerns, and threats about AI that were analyzed by Owolabi et al., privacy problems and threats, regulatory issues, and jobs' automation threat. Namely, they highlighted the issue of job replacement in front-line operations and customer service and back office functions where automation occurs. Emerging Markets Perspective: Similar to the case of Wang et al. (2024), Anbang et al. (2024) revealed that lack of proper technological facilities and ideas of regulation were some of the major barriers facing the implementation of Artificial Intelligence in banking, while these parts of the world are advancing slowly.

2.3 AI Applications in Emerging Markets

This was described by Dhyani et al. who pointed that AI is helping to bring a new financial product with confirmation of creditworthiness and with a demand from the financially excluded population. In the emerging markets the green banking technologies were also identified as operational functions with important impacts on environment. Pakistan's Context: Same as previous, Ahmed, Khalid, and Ghafoor (2024) mentioned that Pakistan is still in infancy of using AI in banking sector however; currently, banks are using this technology in risk management, strengthening its operation efficiency and improving customer services. However, more work is needed to develop ICT and security facilities as they are the constraint to the system.

2.4 Pakistan's Technological Landscape in Banking

In a recent study by Liu et al., 2024 on competitiveness of AI for Pakistani banks, the authors argued that digital technologies hence AI cuts costs, enhances decision-making and provides new options in Pakistan and everywhere else. The study equally revealed that collaborations with foreign technology firms such as Huawei helped to boost AI adoption. They broadcast light on Al using the chatbots by smaller banks to understand how it not only cuts the annoying waiting time but also enhances the level of service being delivered. This trend enlightens how Pakistan is moving towards the AI solutions for customer oriented services even all infrastructural and regulatory barriers.

2.5 Challenges of AI Adoption in Pakistan's Banking Sector

There is still a great risk of cyber-attacks is because organizations rely more on digital platforms. Incorporating Security in Pakistani Banks Iqbal, Saleem, & Ahmad (2024) established that if there is no adequate security measurements installed in the integration of the AI system then there are higher risks that the banks may fall prey to cyber-attacks. A final and perhaps one of the most concerning areas that have been identified by Owolabi et al. are privacy concerns for customers where the need for large data to run AI correctly raises high ethical questions about how and when this information is best utilized and protected.

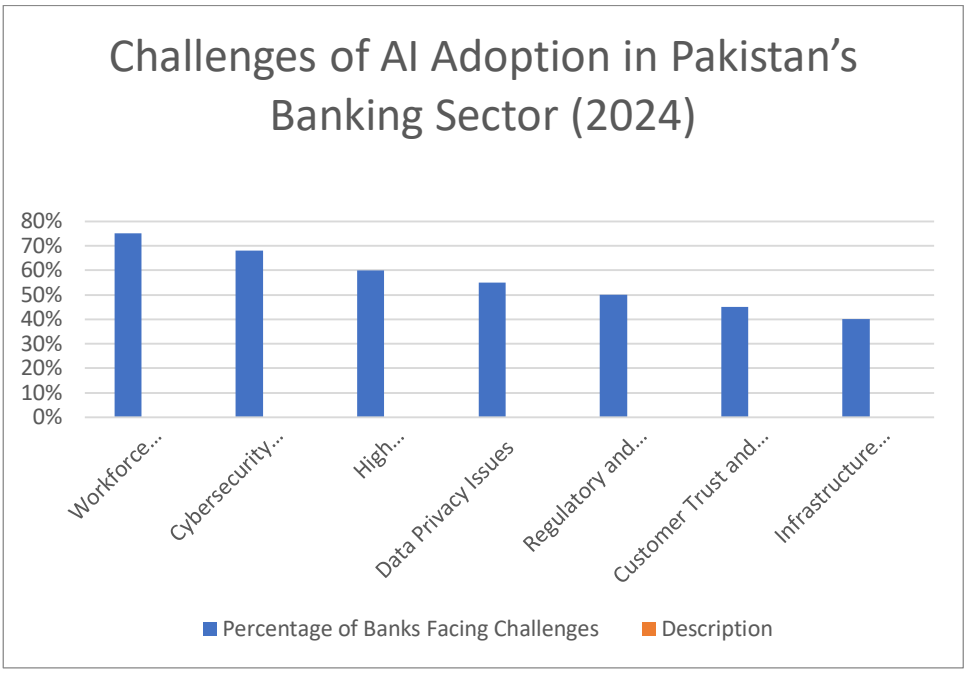
As stated by Ahmed and Ramish (2024) something that threatens the banking workforce is its displacement by AI, that is why they suggested that banks should consider investing in re-skilling for preparing its employees for AI-based occupations. This is important to reduce the social effects confirmed by automation within the field of banking. Ahmed, Khalid, and Ghafoor pointed out the

following as some of the major barriers that hinder the adoption of AI in Pakistan; lack of infrastructure, high speed internet and regulation.

Table 1: Challenges of AI Adoption in Pakistan's Banking Sector (2024)

Challenges	Percentage of Banks Facing Challenges	Description
Workforce Adaptation/Skill Gaps	75%	Lack of skilled personnel to manage and implement AI systems
Cyber security Concerns	68%	Fear of increased vulnerabilities due to AI-driven automation
High Implementation Costs	60%	Costs of integrating AI systems into existing banking infrastructure
Data Privacy Issues	55%	Concerns over compliance with data protection laws and the risk of breaches
Regulatory and Compliance Hurdles	50%	Lack of clear AI-specific regulations, making it challenging to innovate freely
Customer Trust and Acceptance	45%	Customers hesitant to adopt AI-driven services due to privacy or trust issues
Infrastructure Limitations	40%	Banks struggle with legacy systems and outdated technology frameworks

Figure 1: Challenges of AI Adoption in Pakistan's Banking Sector (2024) by Khalid, and Ghafoor (2024)



However, apart from the above, several infrastructural and regulating barriers hinder the implementation of AI in the Pakistani banking sectors. Ahmed, Khalid, and Ghafoor (2024) argued that more funds to buy the requisite capital equipment, including high-speed internet connection and reliable power supply, are significant drawbacks for incorporating AI technologies in Pakistani banks. Furthermore, there are still numerous regulatory issues, including the old banking regulations and the absence of definite requirements as to when and how AI should be adopted. However, given such

threats, the following are potential advantages of implementation of artificial intelligence in the Bank of Pakistan: By doing so, the banks in Pakistan could explore AI technologies to optimize the organizational processes and for competitiveness in the global operation of banking services (Waleed et al., 2023).

2.6 Research Gap

Although the literature of the present study highlights the opportunities for the application of AI in banking which especially in developed countries and some developing countries, few studies have investigated how the context of Pakistan affects the implementation of the AI technology. Most of the work has been dedicated to several broad categories of AI as discussed by Waleed et al. (2023) and Pattnaik et al. (2024) these; fraud detection, customer services and operations. These studies fail to consider the structural, regulatory and social setting of the Pakistani context for adoption of AI which is hurdles. For instance, the banks in Pakistan are constrained by weak connectivity with unreliable or limited internet, uptake of outdated banking technologies, and recurrent power blackouts that hinder the smooth adoption of AI solutions (Ahmed et al., 2024). Further, there is less research done related to the incorporation of Pakistani banks in the regulatory framework and few of the issues include data privacy, Cyber security where the policy is weaker than modern developed countries being Javaid (2024). Further, despite knowing the positive role of A.I for efficiency, the studies are quite scarce about the social consequences for the workforce in the context of Pakistan; like job loss through A.I automation, retraining of the current workforce, etc. There is a clear mandate for research that aims to build models for policies to govern AI to span within the realm of data security, network security and moral issues. If these gaps had been filled, it would be clearer to Pakistan's banking sector heads how risks could be avoided and benefits optimized in the use of AI.

3. Research Methodology

This study employs a mixed-methods approach, integrating qualitative and quantitative data to analyze the adoption of Artificial Intelligence (AI) in Pakistan's banking sector. Qualitative data will derive from semi-structured interviews with key stakeholders across three prominent banks, while quantitative data will focus on specific AI adoption metrics, facilitating a comprehensive analysis of AI's impact on customer service, risk management, and operational efficiency.

3.1 Theoretical Frameworks

Two theories anchor the study's analytical framework: Grounded Theory and Systems Theory. Categorizing is based on the Grounded Theory approach, with vary and relevant investigation of topics concerning AI difficulties and possibilities. This approach makes it easy to embrace an understanding of the subject under review in relation to Pakistani banking by making it easier for themes to emerge from the respondent and primarily with some background of the respondent as an informant (Ahmed and Ramesh 2024). It can assist to study AI as a subsystem of the organization, reveal how an AI integrates into the prevailing structures, and which systemic changes may be required for the most efficient implementation of AI (Hidayat et al., 2024).

3.2 Research Design

The research design mainly uses a qualitative approach as a way of collecting rich information on the adoption of AI in the Pakistani context particularly in banking sector. Qualitative research is especially beneficial for studying the impact of any phenomenon on the socio psychological characteristics of people the role of AI in improving and facilitating customer services and building employees' positive attitudes toward their work, for instance. Unlike other research approaches that may involve computation of numbers, qualitative research aims at having a look at people's behavior

and perception of things through data collections tools such as interviews and observation (Dhyani et al., 2024). Therefore, this study's semi structured interviewing approach gives the study the frame work of structure interviewing technique while allowing the interviewer to go further and investigate other related issues which may come up during the interview.

3.3 Data Collection

Semi structured interviews are the key data gathering tool due to the modality and the level of data that can be retrieved. This approach makes it possible to discuss set questions in detail and it also makes it possible for the interviewer to follow up the respondent's answer to get more information, which could be missing if the researchers were to use structured questionnaires. Semi structured interviews are very useful when seeking different views on AI as it was evident between the two respondents. This method complements the Grounded Theory approach well since the themes are considered given by the participants' responses (Javaid, 2024).

Data collection takes place in both 2023 and 2024 financial years. This period enables the study to capture the evolution of artificial intelligence and evaluate the change in its integration within Pakistan's banking industry. Such a long duration of data collection is inevitable given the dynamism of the AI technology and the progressive advancement of its integration in the banking industry, which creates a constant update of the existing AI tools that affect services' delivery and operations (Ahmed et al., 2024).

3.4 Sampling

The study selects a purposive sample of 10 respondents from three major banks in Pakistan: This is HBL, Faysal Bank Ltd and Bank Alfalah. These banks were selected because of their commitment in the implementation of new technologies such as AI systems. Due to their strength as influential partakers in Pakistan's banking sector, these banks make for an excellent sample for identifying different roles of AI in various aspects of banking, including customer interaction and credit risks (Naeem et al., 2024). They consist of managers, technology specialists and other employees involved in AI initiatives at these banks, which capture both the tactical and the strategic views.

Managers were selected based on their tactical position as AI gatekeepers and their understanding of how AI affects decisions and performance (Choithani et al., 2024). Due to their roles as the executors of technological advancements, technological specialists present a view of the impossibilities and possibilities of AI in banking. The real picture of how AI is actually working on the floor, its positive and negative effects, and the type of engagement employees have with it gives the report valuable insights from the ground level (Iqbal et al., 2024).

3.5 Data Analysis

Data analysis involves a systematic coding and thematic analysis of interview transcripts. After transcription, open coding is conducted to categorize responses into major themes and sub-themes based on topics such as customer service, risk management, and operational efficiency. Grounded Theory supports this process by allowing for emergent themes to arise as interviews unfolds, providing a structured yet flexible approach to qualitative data analysis (Ahmed & Ramesh, 2024). The coding structure is refined to capture responses that highlight common challenges and innovations associated with AI in banking, drawing attention to distinct issues within Pakistan's banking context. For example, emerging themes might include AI's role in enhancing fraud detection or its limitations due to infrastructural and regulatory constraints (AL-Dosari et al., 2024). In addition to thematic analysis, Systems Theory aids in analyzing how AI integrates with the existing banking infrastructure in

Pakistan. By examining AI as a system component, the study identifies how AI influences and is influenced by other components, such as cyber security measures and data management protocols. This systems-based perspective facilitates a holistic understanding of AI's role within the banking system, highlighting both technical synergies and potential systemic disruptions (Liu et al., 2024).

3.6 Quantitative Data Integration

This study also includes quantitative data to supplement the qualitative data to contribute analysis of the AI adoption measurements of the Pakistan's banking sector. These are the rate of incorporation of AI in the various businesses, performance of customers after adoption of AI systems, qualitative data on efficiency of using AI techniques for detecting fraud before and after the integration process. These metrics are sourced from internal bank reports, industry publications, and prior studies, providing a quantitative foundation that complements the qualitative insights gathered from interviews (Nawaz et al., 2024). AI and its challenges through the use of qualitative interviews and quantitative measurement data since a combination of these data types provides a rich view of the subject matter. The objective measures are more useful in the assessment of the impact of AI on operational performance as compared to the qualitative details which provide the background and explain quantitative findings in banking, the quantitative results are used to give a look at how the changes resulting from the use of AI reflect the operations of the industry and the strategies used.

4. Results

4.1 AI in Daily Operations

According to the analysis, the research helps investigate whether AI is being incorporated in the three banks, namely, HBL, Faysal Bank, and Bank Alfalah, daily. The top AI use cases are customer service chatbots, fraud detection models, data analytics for customer profiling, and AI in client-oriented banking. For instance, Bank Alfalah deploys its chatbots to deal with preliminary customer inquiries, leaving low-level tasks for artificial intelligence. Likewise, HBL has incorporated AI fraud detection algorithms that remarkably identify device and transaction behavior in real time and reinforce security.

Table 2: Common AI Applications in Three Banks

AI Application	HBL	Faysal Bank	Bank Alfalah
Chatbots	Implemented	Implemented	Implemented
Fraud Detection	Implemented	In Progress	Implemented
Personalized Services	Implemented	Implemented	Implemented
Predictive Analytics	In Progress	Implemented	Implemented

4.2 Employee Perception of AI

Employees and AI have different perceptions of it in the organization. A pilot survey of managers and technology specialists indicated that all respondents saw AI as a technology that enhances productivity and decision-making. They like AI's capacity to reduce responsibilities and provide more time to undertake insightful activities. However, low-skilled telephone-based customer service and back-wash office employees voice their fears of job automation. Overall, most employees think that although AI has helped lower their work burden in most cases, its introduction has made them concerned about future job security. Some respondents also point out that AI has brought a layered challenge where they need to train new systems and frequently deal with artificial intelligence tools. However, the technology experts in these banks view this as an inevitable progression. They encourage companies to invest in these training and development programs to prepare employees for an AI-heavy future.

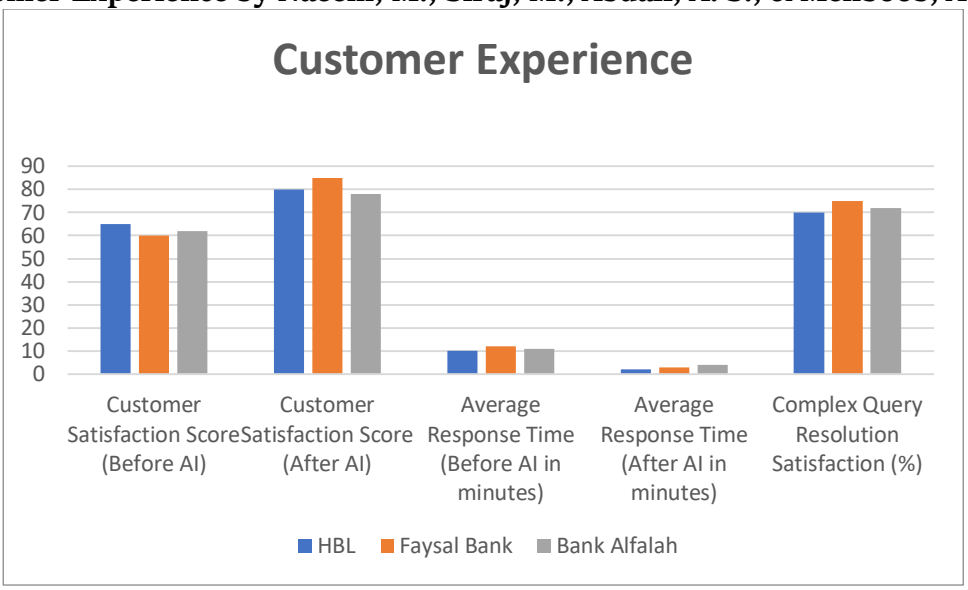
4.3 Customer Experience

As a result of AI, customer experience in the three banks has been enhanced. Today's clients benefit from fast and effective customer service through artificial intelligence chats and voice recognition. It also provided facilities to avail of more personal banking services. For instance, the Faysal Bank AI system can review the credit and offer credit cards or loans that are suitable for the customer, increasing customer satisfaction.

Table 3: Customer Experience

Bank	Customer Satisfaction Score (Before AI)	Customer Satisfaction Score (After AI)	Average Response Time (Before AI in minutes)	Average Response Time (After AI in minutes)	Complex Query Resolution Satisfaction (%)
HBL	65	80	10	2	70
Faysal Bank	60	85	12	3	75
Bank Alfalah	62	78	11	4	72

Figure 2: Customer Experience by Naeem, M., Siraj, M., Abdali, A. S., & Mehboob, A. (2024)



The survey shows that AI has positively changed customer satisfaction scores, mainly with quicker resolution of issues and around-the-clock support. However, to some respondents, the role of AI is acceptable while performing simple queries. However, customers are dissatisfied when they have more complicated issues because an AI system has a different understanding than human staff members.

4.4 Operational Efficiency

AI has been found to advance the daily efficiency of the three banks under consideration. It analyses fraud cases and recommends action in a much shorter time; it is used to identify and label suspicious activities. Also, using data analytics in decision-making has been boosted through artificial intelligence to provide real-time customer behavior and market trends. For example, HBL has reduced the time it takes to grant loans by using AI, which detects risks faster than conventional approaches. Bank Alfalah also noted management satisfaction in processing transactions, meaning that many

backend operations, including input and output, have become automated because of the use of artificial intelligence systems (Javaid, 2024).

Table 4: AI Impact on Operational Efficiency

Efficiency Metric	HBL Improvement	Faysal Bank Improvement	Bank Alfalah Improvement
Fraud Detection Time	40% faster	25% faster	50% faster
Loan Approval Time	30% faster	20% faster	40% faster
Transaction Processing Speed	35% faster	30% faster	45% faster

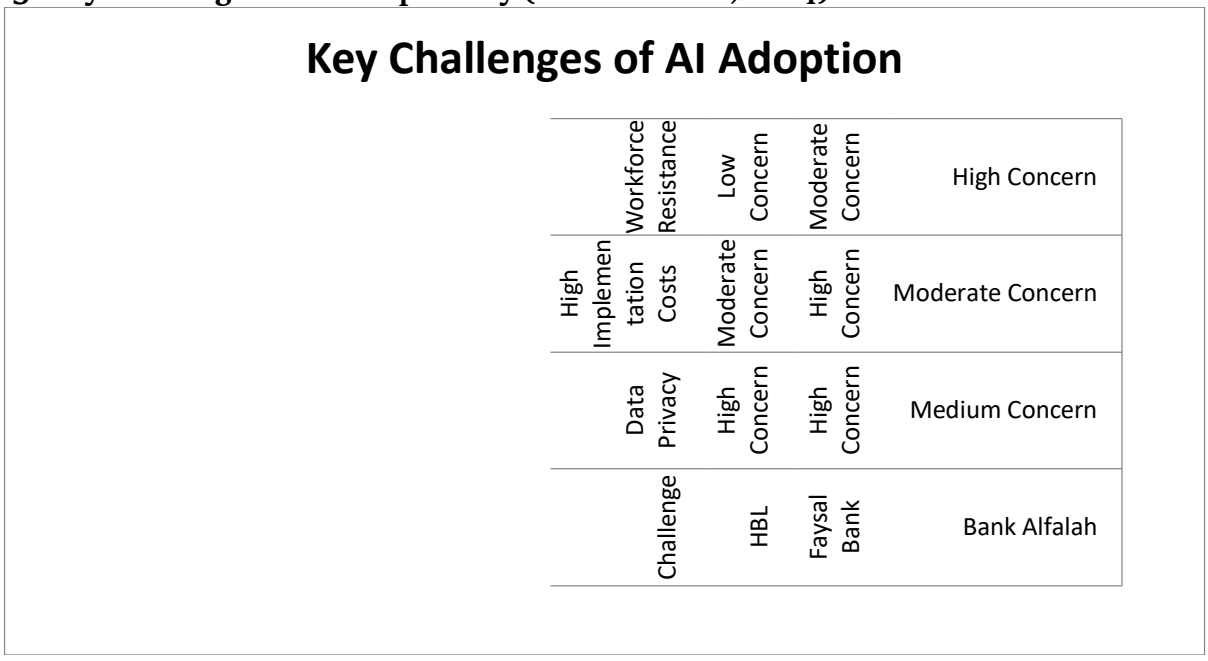
4.5 Challenges Identified

However, several challenges were identified when posing several questions to the respondents. One aspect is that there is a common problem in the three banks, including data privacy. Since most AI system implementation depends on large quantities of customer data, data protection could be improved. Some of the interviewees from Faysal Bank reported that they are legally bound to provide high levels of protection to customers' data, which makes it more challenging and costly for firms in the organization of AI. Another considerable factor is the costs incurred when adopting and implementing AI systems in an organization. Incumbent small-scale or low-budgeted banks cannot invest in advanced technologies like those supporting AI. Besides, the workforce is relatively resistant to change, especially older employees; they feel they need to be more comfortable with change to AI-based processes (Owolabi et al., 2024)

Table 5: Key Challenges of AI Adoption

Challenge	HBL	Faysal Bank	Bank Alfalah
Data Privacy	High Concern	High Concern	Medium Concern
High Implementation Costs	Moderate Concern	High Concern	Moderate Concern
Workforce Resistance	Low Concern	Moderate Concern	High Concern

Figure 3: Key Challenges of AI Adoption by (Owolabi et al., 2024)



AI has to do with aspects of banking operations whereby the customers and the overall activities of businesses are made efficient. Therefore, the benefits of AI implementation include efficiency, cost reduction, error minimization, and revenue maximization. On the other hand, the risk factors include Data privacy, high cost of implementation, and employee resistance.

5. Discussion

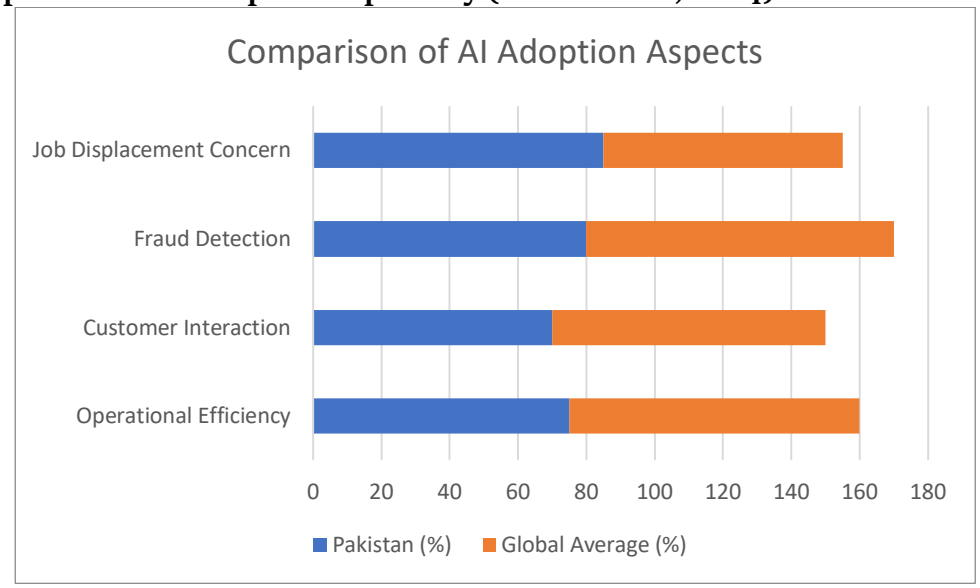
5.1 Interpretation of Results

The study of AI implementation in Pakistan's banking industry exhibits similarities and differences in varying contexts to global benchmarks. As with the rest of the world, AI has dramatically enhanced the ways of doing business, customer relations, and fraud control in Pakistan's banks in similar ways observed in the Western or other Asian banking systems (Pattnaik et al., 2024). Nevertheless, some contextual factors differ from others in Pakistani AI adoption. Unlike developed countries where AI-integrated banking comes quickly, Pakistan has problems, such as a lack of infrastructure, many uncertainties in Pakistani rules and regulations, and fear of data privacy and protection (Javaid, 2024). This divergence clearly explains why more localized strategies for leveraging the benefits of AI need to be developed in the country.

Table 6: AI Implementation in Pakistan's Banking Industry

Aspect	Pakistan (%)	Global Average (%)
Operational Efficiency	75	85
Customer Interaction	70	80
Fraud Detection	80	90
Job Displacement Concern	85	70

Figure 4: Comparison of AI Adoption Aspects by (Naeem et al., 2024)



Global trends also shift the focus to using AI for customer services by introducing chatbots and differentiated financial instruments. Pakistani has also commenced in this regard. However, similar to previous findings, it was revealed that the employees' perceptions indicated higher levels of fear towards job loss because of the disruptive effects of technology in Pakistan, especially in customer-facing and operational jobs. Thus, this is evidence that Pakistan's labor market may be more at risk of being disrupted by technology than other regions with substantive organized employment pathways for retraining programmers (Owolabi et al., 2024).

5.2 Benefits of AI

AI has brought unprecedented value to Pakistan's banking industry. The most noticeable reform has probably been in the area of customer relations. Artificial intelligence in chatbots and virtual assistants has maximized the speed of customer service delivery due to always being available to respond to basic common queries that may flood the customer service desk, freeing human beings consistently (Maseke, 2024). It enables banks to attend to the growing customer demand without a corresponding rise in staff costs and offers a faster response to customers, leading to increased satisfaction.

It must also be said that such effects as increased operational efficiency have been improved, for instance, through distinguishing customers' information to deliver loans faster with the help of AI algorithms. In the back end, using AI in data entry and transaction verification activities has also saved time and eliminated errors that may be caused by human beings, making the operations of banking services faster (Javaid, 2024). This efficiency improvement has been incredibly beneficial for small banks, which have to overcome some of their limitations compared to large ones by performing more efficient operations.

As for the con aspect, AI systems applied in Pakistan have revealed a significant tendency towards detecting fraud while preventing it. AI in transactional datasets enables the identification of parties' behavior in real-time instead of gleaning through large data sets with the help of analysts because the performance of AI algorithms is superior to that of an analyst (Maseke, 2024). These have caused a reduced rate of financial loss due to fraud due to the installation of fraud prevention measures.

5.3 Challenges

However, several specific factors make AI adoption more challenging for Pakistani banks than their counterparts in more developed markets. This is the case mainly due to regulatory challenges, which still need to be solved. Even as world financial regulators integrate AI in banking, Pakistani settings remain nascent, and well-defined legal rules on using AI and data protection policies still need to be established (Javaid, 2024). Banks are, therefore, running their operations in a relatively ambiguous legal framework, which explains the slow adoption of AI technologies.

However, the confidentiality of data is much more challenging in Pakistan because the cyber security conditions are somehow weaker than at international levels. As AI systems depend on the massive data of customers, the growing instances of data breach and misuse have become an issue of concern for banks, and AI integration for operational enhancements provides robust data security measures to banks (Owolabi et al., 2024).

There is also a problem with the organizational assimilation of AI, including training workers who resist the technology because they believe AI displaced them. This is a big worry given Pakistan's labor market, which needs more training and transition programs often seen in developed economies (Pattnaik et al., 2024). Therefore, it is difficult to generate much opposition from the workers; this is especially prevalent in customer care and support operations functions.

5.4 Practical Implications

Consequently, this study's results present several valuable practical insights for banks and policymakers in Pakistan. To reduce the chance of resistance from employees, banks should pay attention to efforts that measure up correctly with the implementation of AI possibilities. Making available reskilling programs can go a long way in ensuring that employees move to other higher

human intervention jobs as they fear being displaced by the technologies. Moreover, for data privacy and to be ready in case of future legal requirements, cyber security has to improve profoundly. To the policymakers, it is, therefore, important that there are brought into existence policy frameworks about the use of AI within the banking sector with a particular reference to the legislation that surrounds the protection of data belonging to clients while at the same time encouraging innovation. The formulation of a regulatory structure that enhances the use of artificial intelligence without exposing the country to risk assists the banking sector of Pakistan in embracing all aspects of artificial intelligence, hence boosting its competitiveness.

6. Conclusion and Policy Recommendations

The research focuses on how Artificial Intelligence (AI) has emerged as a new shifts Pakistan's banking industry bringing about changes relating to service delivery, risks and operations. These were from the mixed-methods combining both the qualitative from the semi-structured interviews and quantitative results as highlighted below. Notably, during the assessment of the progress made for the implementation of AI in major Pakistani banks including Habib Bank Limited, Faysal Bank, and Bank Alfalah, the issue of data security, revolutions, and staff training has remained active challenges. These emergent themes depict that while AI has massive opportunities for expansion and enhancing customer experiences, it is structured with challenges that are best solved by a rather thorough approach during integration.

The following policy recommendations can however be deduced from the findings made in this study. First, public authorities and regulating institutions have to better define general principles of AI application in the banking sector concerning safety and ethical issues to create appropriate conditions for developing technologies. secondly, the banks should ensure it incorporates employee training sessions on ongoing basis to enable the human resource acquire adequate skills in the usage of Artificial Intelligence in performance of their duties in order to enhance levels of employees' satisfaction as well as the organizational performance. Also, forming partnership between the banks, Technology Company and educational institutions with aim to foster innovation and research in banking technology would help the sector to have updated with the latest advancement in AI technology.

From the theoretical viewpoint, this study enriches the knowledge about the application of system theory and grounded theory to explain the phenomenon of AI adoption in a developing country, such as Pakistan. In essence, the finding of this research affords usable recommendations as to how banking institutions could optimize and tap into the opportunities that exist in the application of AI while at the same time militating against the risks. The study lays basis for more profound research that would seek to show how the banking institutions could harness these technologies for the benefit of all the stakeholders while at the same time supporting the development of policies and investment in human capital.

References

Ahmed, B., & Ramesh, M. S. (2024). Artificial Intelligence and Future HRM Practices: A Case of Pakistan Business Sector. *Journal of Development and Social Sciences*, *5*(2), 395–405.

Ahmed, S. I., Khalid, M. A., & Ghafoor, S. (2024). Artificial Intelligence Adoption in Developing Countries: Exploring the Use Cases and Challenges for Using AI In Banking Services in Pakistan. *Journal of Business and Management Research*, *3*(1), 303–309.

AL-Dosari, K., Fetais, N., & Kucukvar, M. (2024). Artificial intelligence and cyber defense system for the banking industry: A qualitative study of AI applications and challenges. *Cybernetics and systems*, *55*(2), 302-330.

Choithani, T., Chowdhury, A., Patel, S., Patel, P., Patel, D., & Shah, M. (2024). A comprehensive study of artificial intelligence and cybersecurity on bitcoin, cryptocurrency, and banking systems. *Annals of Data Science*, *11*(1), 103–135.

Dhyani, R., Gupta, L., Tomar, D., & Srivastava, A. (2024). The Role of AI-Based Green Banking Technologies in Ensuring Bank Stability: The Moderating Influence of Climate Change.

Farooq, S., & Pervez, S. (2024). Customer Experience Of Artificial Intelligence In Pakistan: The Oldaa Model. *Kurdish Studies*, *12*(4), 795-806.

Hidayat, M., Defitri, S. Y., & Hilman, H. (2024). The Impact of Artificial Intelligence (AI) on Financial Management. *Management Studies and Business Journal (PRODUCTIVITY)*, *1*(1), 123-129.

Iqbal, F., Nawaz, S. A., Shah, R. A., Gujjar, A. M., Ejaz, A., Dilbar, Z., & Aslam, T. (2024). Impact of Cyber Security Measures in the Digital Banking Sector of Pakistan. *Journal of Computing & Biomedical Informatics*.

Javaid, H. A. (2024). How Artificial Intelligence is Revolutionizing Fraud Detection in Financial Services. *Innovative Engineering Sciences Journal*, *4*(1).

Kanaparthi, V. (2024). Transformational application of Artificial Intelligence and Machine learning in Financial Technologies and Financial services: A bibliometric review. *arXiv preprint arXiv:2401.15710*.

Liu, T. L., Naveed, M. M., Mustafa, S., & Naveed, M. T. (2024). Analyzing the impact of digital technology diffusion on the efficiency and convergence process of the commercial banking industry of Pakistan. *Humanities and Social Sciences Communications*, *11*(1), 1-27.

Maseke, B. F. (2024). The transformative power of artificial intelligence in banking client service. *South Asian Journal of Social Studies and Economics*, *21*(3), 93-105.

Naeem, M., Siraj, M., Abdali, A. S., & Mehboob, A. (2024). The Impact of Investment in AI on Bank Performance: Empirical Evidence from Pakistan's Banking Sector. *KASBIT Business Journal*, *17*(1).

Nawaz, H., Maqsood, M., Ghafoor, A. H., Ali, S., Maqsood, A., & Maqsood, A. (2024). Huawei Pakistan Providing Cloud Solutions for Banking Industry: A Data Driven Study. *The Asian Bulletin of Big Data Management*, *4*(1), 89–107.

Owolabi, O. S., Uche, P. C., Adeniken, N. T., Ihejirika, C., Islam, R. B., & Chhetri, B. J. T. (2024). Ethical implication of artificial intelligence (AI) adoption in financial decision making. *Computer and Information Science*, *17*(1), 1-49.

Pattnaik, D., Ray, S., & Raman, R. (2024). Artificial intelligence and machine learning applications in the financial services industry: A bibliometric review. *Heliyon*.

Waleed, M., Bashir, F., & Nasim, I. (2023). Artificial Intelligence Revolution: Shaping the Future of Millennials. Pakistan Journal of Humanities and Social Sciences, 11(4), 4261–4274.