

A Study of the Challenges in Adopting Artificial Intelligence in the Financial Sector in India

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Abstract—Artificial Intelligence (AI) is emerging as a significant technological force bringing about a revolution in India's financial sector. AI is being widely used in banking, insurance, investment management, and FinTech to improve customer services, manage risks, detect fraud, and enhance the accuracy of decision-making processes. However, several difficulties and challenges are also emerging while adopting AI. The present study aims to examine in depth the major challenges encountered in adopting AI in India's financial sector.

The study is based on secondary information and a review of available literature. The study reveals that data privacy and security concerns, high implementation costs, inadequate technological infrastructure, shortage of skilled human resources, regulatory uncertainty, difficulties in integrating AI with traditional systems, and lack of awareness about technology limit the effective use of AI. In addition, gaining customer trust and maintaining ethics and transparency are also significant challenges.

The findings of the study suggest that these challenges can be addressed through appropriate strategic planning, strong cybersecurity mechanisms, skill development, and a clear and effective regulatory framework. Responsible and effective use of AI technology can make India's financial sector more efficient, secure, and customer-oriented.

Index Terms—Artificial Intelligence, Financial Sector, FinTech, Data Security, Digital Transformation, India

I. INTRODUCTION

In the present digital era, Artificial Intelligence (AI) has emerged as a highly influential technological system that is transforming economies across the world. Particularly in the financial sector, the use of AI is growing rapidly and has brought revolutionary changes in banking, insurance, investment management, stock markets, and FinTech services. AI

has significantly improved efficiency and accuracy in areas such as analysing customer needs, providing personalised services, detecting fraud, assessing risks, and facilitating faster decision-making.

In India, the use of technology in the financial sector has increased substantially due to initiatives such as Digital India, the Pradhan Mantri Jan-Dhan Yojana, Unified Payments Interface (UPI), and the growth of FinTech start-ups. Against this background, the adoption of AI is no longer merely an option but has become a necessity. Several banks and financial institutions are using chatbots, machine learning, and algorithms to improve customer services. As a result, financial services are becoming faster, more convenient, and more effective.

However, although the adoption of AI is highly beneficial, it is also challenging. In a diverse and highly populated country like India, issues related to data privacy and cybersecurity, limitations in technological infrastructure, high investment costs, shortage of skilled human resources, and ambiguity in the regulatory framework create obstacles to the effective implementation of AI. In addition, integrating AI technology with traditional banking systems and gaining customer trust are also important concerns.

Against this background, the topic "A Study of the Challenges in Adopting Artificial Intelligence in the Financial Sector in India" is highly relevant. The present research attempts to examine the nature of AI usage, its benefits, and particularly the various challenges involved in its adoption. The main objective of this study is to provide appropriate direction to financial institutions, policymakers, and researchers and to suggest necessary measures for ensuring the effective and secure use of AI.

II. REVIEW OF LITERATURE

1. Brynjolfsson and McAfee (2017)

According to Brynjolfsson and McAfee, Artificial Intelligence brings revolutionary changes to the business sector; however, its effective implementation requires highly skilled and trained human resources. The same challenge can be observed in India's financial sector. Many banks and financial institutions attempt to adopt AI technology, but they do not always have employees with the necessary technical skills. Consequently, AI systems cannot be used effectively and the expected results may not be achieved.

2. Davenport and Ronanki (2018)

Davenport and Ronanki stated that many organisations initiate AI projects, but their success remains limited because of the absence of clear strategies and proper planning. A similar situation can be observed in the Indian financial sector. Banks attempt to use AI, but due to a lack of long-term planning, proper guidance, and consistency in implementation, they are unable to obtain the full benefits of AI.

3. Fuster et al. (2017)

According to Fuster and colleagues, high-quality and accurate data are essential for the effective functioning of AI systems. In India, financial transaction-related data are not yet completely structured and reliable. Consequently, AI-based decision-making may become inaccurate. Deficiencies in data management therefore constitute a major obstacle to the effective use of AI.

4. Kshetri (2020)

Kshetri emphasised two important issues: cybersecurity and data privacy. As the use of AI increases, large quantities of customers' personal and financial information are stored and processed through digital systems. Without appropriate security measures, this information may be exposed to hacking or misuse. Therefore, many institutions adopt a cautious approach while implementing AI.

5. Arner, Barberis and Buckley (2016)

The researchers highlighted the importance of regulatory challenges in the development of FinTech. Although India has certain regulations relating to AI and FinTech, these regulations are not yet completely clear and integrated. This creates uncertainty among financial institutions while adopting AI technology. Lack of clarity and stability in regulatory policies may restrict AI adoption.

6. Bughin et al. (2018)

Bughin and colleagues observed that implementation of AI technology requires substantial financial investment. Small and medium-sized financial institutions in India often have limited financial resources and therefore face difficulties in adopting AI. High implementation costs make AI technology less accessible to all institutions.

7. RBI Reports (2021–2023)

According to RBI reports, the use of AI in the Indian banking sector is increasing; however, several deficiencies remain in areas such as data protection, customer trust, and technological infrastructure. Further improvements are required to establish secure and reliable AI-based systems.

8. PwC India (2022)

According to PwC India, organisational change management and employee training are important factors in AI adoption. In many Indian organisations, adequate attention is not given to these aspects. As a result, employees face difficulties in adapting to AI technology, which affects organisational efficiency.

9. NASSCOM (2023)

According to NASSCOM, successful implementation of AI requires cooperation between the government and private sector, along with encouragement for innovation and research. There is still scope for improvement in these areas in India. Lack of proper coordination limits the full utilisation of AI technology.

III. RESEARCH METHODOLOGY

➤ Research Design-

A qualitative research design has been adopted for the study titled "A Study of the Challenges in Adopting Artificial Intelligence in the Financial Sector in India." The main objective of the research is to examine in depth the various technological, managerial, financial, and human challenges involved in adopting AI in India's financial sector.

Although the use of AI in the financial sector is increasing day by day, several practical difficulties arise during its implementation. To understand the real nature of these challenges, quantitative information alone is insufficient. It is necessary to analyse the experiences, opinions, observations, and institutional conditions of the people concerned. Therefore, a qualitative research approach has been adopted.

Various qualitative research methods have been used for data collection, particularly the interview method, observation method, document analysis method, and case study method. Through the combined use of these methods, an attempt has been made to obtain a comprehensive, in-depth, and realistic understanding of the research topic.

○ Interview Method-

Under the interview method, in-depth interviews were conducted with officers, employees, technical experts, and management personnel working in public and private sector banks, Non-Banking Financial Companies (NBFCs), and insurance companies.

Through these interviews, an attempt was made to understand the practical challenges faced by institutions while adopting AI, including concerns related to information security, data privacy, shortage of skilled human resources, high implementation costs, and difficulties in adapting to changing technology. Information relating to employee attitudes towards AI, the level of organisational acceptance, and management policies was also obtained through interviews.

○ Observation Method-

The observation method was also used in the study. Through observation, the actual use of AI technology in financial institutions, the implementation process, changes in employee work practices, improvements in customer service systems, and difficulties arising during the use of AI systems were studied.

Observation helped the researcher understand the actual conditions within financial institutions, including coordination between management and employees, availability of technological infrastructure, and changes in efficiency resulting from AI adoption.

○ Document Analysis Method-

Under the document analysis method, various secondary sources related to the research were examined. These included reports of the Reserve Bank of India (RBI), policy documents of the Ministry of Finance, research articles, academic journals, annual reports of financial institutions, government policies relating to AI, and information available on official websites.

The analysis of these documents helped in understanding the theoretical framework, existing policies, technological developments, and current status of AI adoption in the financial sector. The findings and views of various researchers were also examined to establish the academic and practical significance of the topic.

○ Case Study Method-

Through the case study method, selected banks and financial institutions were studied in depth. The study examined their operational practices, AI implementation processes, challenges faced, outcomes, and measures adopted to address these challenges. The case study method enabled a realistic analysis of AI adoption based on the experiences of specific institutions. It also helped in comparing differences in operational practices, levels of technological preparedness, and management approaches among various institutions.

For sample selection, purposive sampling and convenience sampling methods were used. Individuals and institutions directly related to the research topic and capable of providing relevant information were selected.

Primary data were collected through interviews, observations, and case studies, while secondary data were obtained from official documents and research literature. The combined use of interviews, observation, document analysis, and case studies made the research more comprehensive, reliable, and realistic.

➤ Data Collection-

For the study of the challenges involved in adopting AI in India's financial sector, the process of data collection was conducted in a systematic and scientific manner to ensure reliable and accurate findings.

Two major sources of data were used: primary data and secondary data. Primary data were collected directly from relevant respondents, while secondary data were obtained from already available reliable sources.

For primary data collection, a structured questionnaire was used. The questionnaire was designed for employees, technical experts, and management officials working in the financial sector. It included questions related to various challenges in adopting AI, such as technical barriers, information security issues,

cost-related difficulties, and lack of training and skills.

In addition, interviews were conducted with selected experts and senior officials to obtain in-depth information. These interviews helped in understanding the practical and experience-based perspectives of AI adoption.

Secondary data were collected from academic research articles, journals, books, RBI reports, annual reports of financial institutions, and official websites. These sources provided detailed information regarding the use of AI, its effects, and challenges involved in the adoption process.

Data collection was completed during a specified period through personal visits, telephone communication, and online platforms. To ensure accuracy and reliability, the collected information was verified, classified, systematically recorded, and analysed.

➤ Background of the Research Topic-

In the modern digital era, Artificial Intelligence is developing rapidly. AI refers to technology that enables computers or machines to perform tasks associated with human intelligence, such as thinking, learning, decision-making, and problem-solving.

In India's financial sector, the use of AI is increasing in banking, insurance, accounting, taxation, digital payments, stock markets, and FinTech companies. AI has increased transaction speed, improved customer services, and enhanced the security and accuracy of financial transactions. Initiatives such as Digital India, UPI, online banking, and mobile payments have contributed significantly to the rapid expansion of AI-based financial services in India.

In the banking sector, AI is used for customer service, loan approval, fraud detection, and transaction analysis. Many banks use chatbots to answer customer queries. With the help of AI, customer transactions can be monitored and suspicious transactions can be identified immediately.

In the insurance sector, AI is used to assess insurance claims and identify fraudulent claims. In accounting and taxation, AI facilitates the preparation of financial reports, tax analysis, and data management. In stock markets, AI-based systems analyse market fluctuations and assist investors.

Despite these benefits, several challenges arise while adopting AI. One of the major challenges is data

privacy and security. AI systems use large quantities of customers' personal and financial information. If such data falls into the wrong hands, it may result in financial fraud, hacking, and information theft. This may reduce customer trust in financial institutions.

Another major challenge is the high initial cost of AI implementation. Developing AI systems requires significant investment in modern computers, software, cloud technology, and data management. Large banks and financial institutions may be able to bear these costs, but small financial institutions and cooperative banks may find them difficult to afford.

The availability of trained and skilled human resources is another major challenge. Financial institutions require employees with appropriate AI-related skills. Therefore, institutions need to spend additional time and resources on employee training.

In rural and remote areas of India, inadequate technological infrastructure is also a serious problem. Internet connectivity, digital literacy, and access to computing facilities may be insufficient in many areas. As a result, AI-based financial services do not reach all sections of society equally. This may increase the digital divide.

Legal and regulatory challenges related to AI are also important. Comprehensive and clearly defined regulations for all aspects of AI use are still evolving. If an AI system makes an incorrect decision, determining responsibility can be difficult. Strong data protection regulations are therefore necessary.

There is also a possibility of algorithmic bias in AI systems. AI systems trained on inaccurate or biased data may make unfair decisions regarding certain customers. For example, some customers may be unfairly rejected during the loan approval process.

AI may also affect employment. Since many routine and repetitive tasks are increasingly automated, certain traditional jobs may decline. Human involvement in areas such as data entry, customer service, and basic accounting may decrease. This may create concerns regarding employment.

Furthermore, some customers do not fully trust AI-based services. Reduced human interaction may sometimes make customers feel insecure. To address these challenges, financial institutions should develop strong cybersecurity systems and use data encryption and multi-factor authentication. Employees should receive regular AI-related training. The government

should develop clear policies and effective data protection regulations. Internet infrastructure and digital literacy should be strengthened in rural areas. Human supervision should also be maintained rather than relying completely on AI systems.

➤ Research Tools-

The study has primarily adopted qualitative research techniques. Since the main objective is to understand the challenges, underlying causes, and actual conditions associated with AI adoption in the financial sector, qualitative methods are appropriate.

The major research tools used in the study include:

1. Interview Method
2. Observation Method
3. Document Analysis Method
4. Case Study Method

Through interviews, information based on the experiences of financial experts, officials, and employees was collected. The interviews helped in understanding technological, financial, skill-related, and managerial challenges.

Through observation, the functioning of financial institutions, use of technology, implementation of AI systems, and changes in employee work practices were studied.

Document analysis involved examining official reports, annual reports, research articles, policy documents, and other relevant sources. Through case studies, selected financial institutions were examined in detail with respect to AI adoption, challenges, solutions, training, and technological changes.

IV. RESEARCH TECHNIQUES

➤ Qualitative Techniques-

○ Interview Method-

The interview method was used as an important research tool in the study. Through this method, information, experiences, opinions, and observations were collected directly from experienced individuals associated with the financial sector. Interviews were conducted with bank officials, financial experts, IT employees, AI engineers, cybersecurity experts, and selected customers. Bank officials explained administrative and managerial challenges associated with AI implementation, including implementation costs, employee training requirements, and changes in traditional work practices.

Financial experts stated that although AI improves the efficiency of financial services, it also increases concerns relating to data privacy and cybersecurity. Since AI systems process large amounts of personal and financial information, the possibility of information leakage and data theft is a significant concern. IT employees and AI engineers provided information about technical challenges. AI systems require high-quality data, modern technological infrastructure, and skilled personnel. However, many financial institutions still use legacy computer systems, making AI integration difficult.

They also highlighted challenges such as maintaining the accuracy of AI models, reducing algorithmic bias, and continuously updating systems. Interviews with customers helped in understanding their trust and attitudes towards AI. While many customers found AI-based services such as chatbots, digital loan processing, and automated transactions convenient, some expressed concerns about the safety of their personal information. Customers in rural areas and those with limited technological knowledge were found to experience greater fear and confusion regarding AI-based systems.

Interviews also provided important information about the impact of AI on employment. Some employees expressed concerns that automation could affect traditional jobs, particularly in data entry, customer service, and routine administrative activities.

The interview method enabled the researcher to analyse not only statistical information but also the experiences, feelings, challenges, and expectations of stakeholders. This contributed to making the research more realistic, reliable, and meaningful.

○ Observation Method-

The observation method was used to study the actual use of AI technology in financial institutions, operational procedures, employee and customer behaviour, and challenges arising during implementation. Various banks, financial institutions, and digital service centres were observed. The study included AI-based chatbot services, digital loan processing, automated customer service systems, fraud detection systems, and data analytics systems.

It was observed that although AI systems were functioning effectively in many institutions, certain technical limitations remained. In particular, legacy computer systems created difficulties in AI

integration. In some places, limitations relating to internet speed, data management, and technological infrastructure affected the effectiveness of AI-based services.

Observation of employee work practices indicated that AI increased work speed, but many employees required training to operate new technologies. Some employees were also hesitant to completely rely on AI systems, particularly where automated decision-making reduced the perceived level of human control. Customer behaviour indicated that customers in urban areas were generally more confident in using AI-based digital services, whereas customers in rural areas or those with limited technological knowledge experienced greater confusion and hesitation.

Some customers expressed concerns regarding the safety of personal information while conducting digital transactions. Many customers also required human assistance while using chatbots or automated services. The observation method enabled the researcher to obtain a realistic understanding of the actual situation, employee and customer behaviour, technical problems, and managerial challenges associated with AI adoption.

○ Document Analysis Method-

Document analysis was used as an important research technique to collect information from official, academic, and institutional documents. The study included RBI reports, policy documents of the Ministry of Finance, government guidelines, annual reports of banks, research papers, journals, periodicals, cybersecurity reports, and national and international studies relating to AI.

The analysis of RBI reports provided information about digital transformation in banking, FinTech development, digital payment systems, and the increasing use of AI-based services. RBI regulations relating to customer data security, cybersecurity, and digital transaction security were examined to understand the regulatory responsibilities of financial institutions adopting AI.

Government policies and guidelines were studied to understand initiatives related to Digital India, AI development, and data protection. Annual reports of public and private banks were examined to understand the use of AI in customer service, digital banking, automated customer service, fraud detection, and risk management.

Research papers and journals provided academic perspectives on the benefits, limitations, and impact of AI on the financial sector. These studies highlighted improvements in efficiency, accuracy, and decision-making while also identifying concerns relating to algorithmic bias, data privacy, cybersecurity, and employment. Cybersecurity-related documents were also analysed to understand threats such as cyberattacks, data theft, hacking, and information leakage.

Document analysis provided a broader historical and policy perspective and helped in comparing changes in AI development, regulatory improvements, and digital transformation in the financial sector.

○ Case Study Method-

The case study method was used to examine selected banks and financial institutions in detail. It helped in analysing the practical use of AI, its outcomes, implementation challenges, and measures adopted to address these challenges.

Major public and private sector banks were selected for study, including State Bank of India (SBI), HDFC Bank, and ICICI Bank, along with selected digital financial institutions. The study examined the use of AI in customer service, fraud detection, digital payments, loan approval, data analytics, and risk management.

Case Study of SBI-

State Bank of India (SBI), being one of India's largest public sector banks, provides an important case for studying AI adoption. SBI introduced an AI-based chatbot named "SIA" to improve customer service and provide assistance to customers around the clock. The case study indicates that AI helped provide faster responses to customer queries and improved operational efficiency.

However, SBI faced challenges relating to management of large volumes of customer data, legacy computer systems, and shortage of skilled technical human resources. Rural customers also faced difficulties while using digital services. To address these challenges, SBI adopted measures such as digital literacy initiatives, employee training programmes, and cybersecurity measures.

Case Study of HDFC Bank-

HDFC Bank is recognised as a private sector bank that has adopted technology extensively. The bank has used AI for analysing customer transactions, detecting fraud, assessing loan eligibility, and providing personalised banking services. AI systems analyse customer transaction patterns and help identify suspicious transactions. AI has improved the speed and accuracy of decision-making.

However, data privacy, cybersecurity risks, and potential bias in AI models remain significant challenges. AI-based systems may sometimes produce incorrect conclusions. To address these challenges, the bank has emphasised data encryption, regular system updates, and continuous monitoring of AI models.

Case Study of ICICI Bank-

ICICI Bank developed an AI-based virtual assistant called “iPal.” It provides customers with account information, transaction details, and various banking services through digital channels. The case study indicates that AI saves customers’ time and makes services more convenient.

However, ICICI Bank faced challenges related to technical investment, high implementation costs, and data security. Some customers lacked confidence in AI-based services. Senior citizens and customers with limited technological knowledge particularly required additional assistance in understanding digital systems. To address these concerns, customer guidance and digital assistance services were made available.

V. FINDINGS FROM THE CASE STUDIES-

The case studies provided a realistic understanding of the practical implementation of AI. All the banks studied showed improvements in operational efficiency, customer service, and transaction management through AI. At the same time, technological limitations, data privacy, cybersecurity, shortage of skilled human resources, and the challenge of gaining customer trust emerged as major concerns.

The case studies also demonstrated that modern technology alone is not sufficient for successful AI adoption. Effective management, employee training, strong security systems, and customer awareness are equally important.

VI. FINDINGS AND CONCLUSION-

The study highlights various aspects of the challenges involved in adopting Artificial Intelligence in India’s financial sector. The information obtained from respondents indicates that although most financial institutions have a positive attitude towards AI, they face several obstacles during actual implementation.

Technological infrastructure emerged as one of the major challenges. Many institutions do not have sufficiently modern computing systems, updated software, or adequate capacity to handle large volumes of data. Consequently, the effective use of AI remains limited.

Information security is another major concern. Since financial transactions involve highly sensitive information, data theft, cyberattacks, and privacy violations pose serious risks. Therefore, many institutions adopt a cautious approach towards AI.

The shortage of trained and skilled human resources is also a significant challenge. Limited availability of employees with the required technical skills delays the adoption of new technologies. From a financial perspective, developing and implementing AI systems is a costly process. This is particularly challenging for small and medium-sized financial institutions. As a result, AI adoption in such institutions remains limited. Other challenges include resistance to organisational change, uncertainty regarding new technology, and lack of appropriate strategies. The analysis indicates that institutions that have invested in proper planning, training, and technology are able to use AI more effectively.

Overall, the findings suggest that successful AI adoption requires a balance among technological, financial, human, managerial, and regulatory factors. Proper planning, training, security measures, and government support can help reduce these challenges and facilitate broader and more effective use of AI in India’s financial sector.

VII. RECOMMENDATIONS-

Based on the findings of the study, the following recommendations can be made for effective adoption of Artificial Intelligence in India’s financial sector:

1. Strengthening technological infrastructure: Financial institutions should significantly improve their technological infrastructure. Modern computing

systems, adequate data-processing capacity, and compatible systems are essential for effective AI adoption.

2. Strengthening data security:

Data security should be given the highest priority. Financial institutions should implement advanced security measures, continuous monitoring, and effective risk-management systems to protect customers' confidential information.

3. Developing skilled human resources:

Employees should receive regular training to improve their technical skills and enable them to adapt to new technologies. Financial institutions should collaborate with educational institutions and training centres to promote skill development.

4. Financial planning and support:

Institutions should undertake proper financial planning for AI implementation. Government financial assistance, incentives, and concessions should be considered for small and medium-sized financial institutions to facilitate AI adoption.

5. Promoting organisational readiness:

Management should develop a positive organisational attitude towards technological change. Employees should be actively involved in the AI adoption process to reduce resistance to change.

6. Developing a clear regulatory framework:

The government and regulatory authorities should establish clear guidelines, regulations, and monitoring mechanisms for the safe, ethical, transparent, and responsible use of AI.

7. Promoting customer awareness:

Financial institutions should conduct awareness programmes to educate customers about AI-based financial services, data security, digital fraud prevention, and responsible use of digital services.

8. Maintaining human oversight:

AI should not be used without appropriate human supervision, especially for critical financial decisions such as lending, investment, fraud assessment, and customer eligibility. Implementation of these measures can promote the wider, safer, and more effective use of Artificial Intelligence in India's financial sector.

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