

Impact of Artificial Intelligence (AI) on Service Quality and Customer Experience in the Banking Sector: An Empirical Study of National Capital Region (NCR), India

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Abstract: The Indian banking industry has undergone a remarkable transformation over the last decade, driven by rapid technological advancements and the increasing integration of Artificial Intelligence (AI). AI-powered banking solutions such as intelligent chatbots, predictive analytics, biometric authentication, fraud detection systems, robotic process automation, and personalized financial advisory services have significantly improved operational efficiency while enhancing customer satisfaction. The National Capital Region (NCR), comprising Delhi, Gurugram, Noida, Ghaziabad, and Faridabad, represents one of India's most digitally advanced banking ecosystems, making it an ideal setting to examine the influence of AI on banking services. The present study investigates the impact of Artificial Intelligence on service quality and customer experience among public and private sector banks operating in NCR. The research adopts a quantitative research design using structured questionnaires administered to 500 banking customers across NCR. Statistical tools including descriptive statistics, reliability analysis, correlation, regression analysis, and hypothesis testing are proposed to evaluate the relationship between AI adoption and customer satisfaction...

Keywords: Artificial Intelligence, Digital Banking, Customer Experience, Service Quality..

1. INTRODUCTION

The global banking industry is witnessing an unprecedented technological revolution driven by Artificial Intelligence (AI), Machine Learning (ML), Big Data Analytics, Cloud Computing, and Internet of Things (IoT). Financial institutions worldwide are investing heavily in intelligent technologies to improve operational efficiency, strengthen cybersecurity, enhance customer experience, and gain competitive advantage. AI has emerged as one of the most disruptive technologies reshaping modern banking by enabling banks to automate routine operations, personalize financial services, and make data-driven strategic decisions.

In India, digital transformation has accelerated significantly following initiatives such as Digital India, Jan Dhan Yojana, Aadhaar-enabled services, Unified Payments Interface (UPI), and increasing smartphone penetration. Customers now expect instant, personalized, secure, and seamless banking experiences across digital channels. Consequently, banks have increasingly adopted AI-powered solutions including conversational chatbots, intelligent virtual assistants, biometric authentication, predictive customer analytics, automated loan processing, fraud detection systems, robo-advisors, and personalized financial recommendations.

Artificial Intelligence enables banks to shift from traditional transactional banking toward intelligent relationship banking. AI-powered systems analyse customer behaviour, spending habits, transaction history, and financial goals to provide customized financial products and proactive recommendations. Intelligent automation significantly reduces processing time for account opening, loan approvals, KYC verification, fraud detection, and grievance resolution, thereby improving customer satisfaction while reducing operational costs.



The COVID-19 pandemic further accelerated digital banking adoption in India. Customers increasingly relied on mobile banking, internet banking, contactless payments, and AI-powered customer support services. Banks strengthened investments in AI to ensure uninterrupted services, maintain operational continuity, and enhance customer trust during uncertain times. Consequently, AI has evolved from being a competitive differentiator to becoming a strategic necessity for financial institutions.

Despite rapid technological advancement, several challenges continue to affect AI implementation in banking. Concerns related to data privacy, cybersecurity threats, ethical use of AI, algorithmic transparency, digital exclusion, and regulatory compliance remain significant barriers. Moreover, customer acceptance of AI-based services varies across demographic segments depending upon age, education, digital literacy, and perceived trust.

2. Banking Sector in NCR: Current Scenario

The National Capital Region is one of India's most significant financial hubs, accounting for a substantial share of digital banking transactions. Public sector banks such as State Bank of India (SBI), Punjab National Bank (PNB), Bank of Baroda, and Canara Bank coexist with leading private banks including HDFC Bank, ICICI Bank, Axis Bank, Kotak Mahindra Bank, IndusInd Bank, and Yes Bank. These institutions have made significant investments in AI-driven technologies to improve operational efficiency and customer engagement.

NCR also serves as a hub for numerous FinTech companies specializing in digital payments, lending, wealth management, and financial analytics. Collaborations between banks and FinTech firms have accelerated innovation in AI-powered customer service, risk assessment, fraud management, and personalized financial planning.

Customers in NCR exhibit high digital literacy and widespread adoption of mobile banking applications, UPI transactions, QR-code payments, and contactless banking services. Consequently, customer expectations regarding service speed, personalization, convenience, and security continue to increase, compelling banks to leverage AI as a strategic competitive advantage.

The region's diverse customer base—including salaried professionals, entrepreneurs, students, retirees, and SMEs—provides a rich environment for analysing customer perceptions of AI-enabled banking services across different demographic groups.

3. Review of Literature

Artificial Intelligence (AI) has become a transformative force in the global banking industry, enabling financial institutions to improve customer service, operational efficiency, fraud prevention, and decision-making. Researchers have increasingly explored the role of AI in enhancing banking service quality and customer experience, particularly in the era of digital transformation.

Satheesh and Nagaraj (2021) examined the application of Artificial Intelligence in banking and concluded that AI significantly enhances service quality by improving operational efficiency, minimizing transaction errors, and providing personalized banking services. Their study emphasized that AI-driven automation improves customer responsiveness while reducing operational costs.

Bhattacharya and Sinha (2022) investigated the influence of AI on customer experience in commercial banks. Their findings suggested that AI-powered chatbots, predictive analytics, and recommendation systems positively affect customer satisfaction by providing instant and personalized financial assistance.

Husain et al. (2022) conducted a systematic review of AI applications in banking and found that intelligent automation significantly improves decision-making, risk management, customer engagement, and regulatory compliance. However, the study highlighted ethical concerns regarding algorithmic transparency and customer privacy.

Tawnih et al. (2022) explored customer perceptions toward AI-assisted banking services. Their research revealed that trust acts as a mediating factor between AI adoption and customer loyalty. Customers who perceive AI systems as secure and reliable exhibit greater satisfaction and long-term engagement with banking institutions.

Karthiga et al. (2023) comprehensively examined AI applications in fraud detection, credit scoring, customer relationship management, and regulatory compliance. Their findings indicated that AI substantially reduces operational risks while improving customer experience through personalized financial services.

Singh and Sharma (2023) investigated AI adoption among Indian public sector banks. Their research found that digital banking adoption has accelerated significantly following the implementation of AI-enabled customer support systems. The authors recommended greater investment in AI infrastructure to improve financial inclusion.

Kumar and Bansal (2024) examined AI-powered fraud detection systems in Indian banks and concluded that machine learning algorithms reduce fraudulent transactions while increasing customer confidence in digital banking platforms.

Mishra et al. (2024) studied AI-driven customer relationship management practices among private banks and found that predictive analytics improves customer retention by enabling banks to anticipate customer needs and recommend suitable financial products.

Sharma and Gupta (2024) investigated AI adoption among millennials in Delhi-NCR. Their findings revealed that younger customers exhibit higher acceptance of AI-based financial services compared to older customers due to greater digital literacy.

Agarwal et al. (2024) analysed customer trust in AI-enabled financial advisory systems and concluded that transparency and explainability remain crucial determinants of AI acceptance.

World Economic Forum (2024) reported that AI-driven banking institutions experience improved operational efficiency, lower fraud losses, faster loan approvals, and higher customer retention rates compared to conventional banking systems.

McKinsey Global Institute (2025) estimated that AI could generate substantial value for financial institutions through intelligent automation, predictive decision-making, and enhanced customer engagement.

Deloitte (2025) reported that AI adoption among Indian banks continues to increase due to growing customer expectations for seamless digital experiences and instant financial services.

PwC India (2025) observed that AI-powered banking significantly improves service responsiveness, reduces turnaround time, and enhances customer trust through secure digital transactions.

EY India (2025) emphasized that successful AI implementation requires balancing technological innovation with responsible AI governance, ethical decision-making, and customer privacy protection.

4. Research Gap

Although extensive research has examined AI adoption in the banking industry worldwide, several important research gaps remain.

Most previous studies have concentrated on developed economies or provided broad analyses of AI implementation without considering regional differences within India. Existing research primarily investigates operational efficiency, fraud detection, or technological innovation while giving comparatively less attention to customer experience in metropolitan banking ecosystems.

Furthermore, limited empirical evidence is available regarding how customers in the National Capital Region perceive AI-enabled banking services. NCR represents one of India's most digitally advanced financial markets with a unique mix of public sector banks, private banks, foreign banks, and FinTech organizations. Customer expectations, digital literacy, and technology adoption differ considerably from other regions of India. Therefore, this study attempts to bridge these gaps by empirically examining the impact of Artificial Intelligence on service quality and customer experience among banking customers in Delhi-NCR.

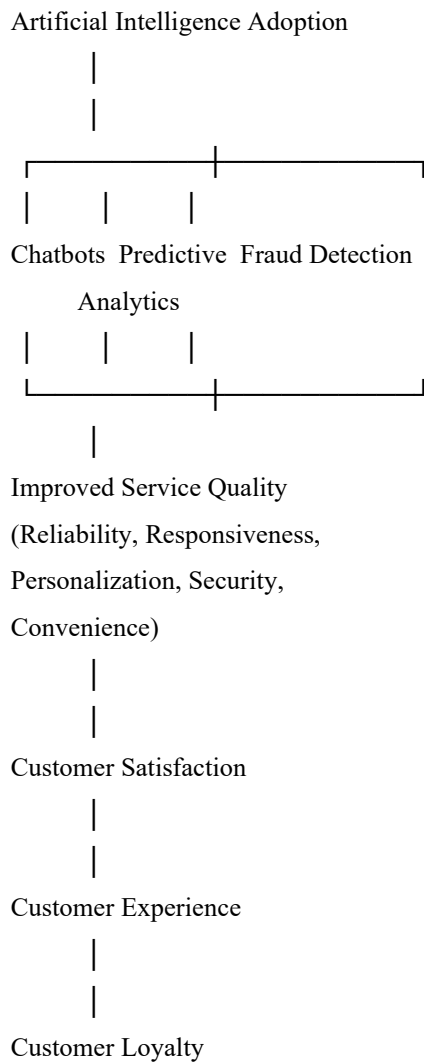
Table 1. Summary of Research Gap

Author	Focus Area	Research Gap
Satheesh & Nagaraj (2021)	AI and Service Quality	Limited Indian metropolitan focus
Husain et al. (2022)	AI Applications	No empirical customer study

Author	Focus Area	Research Gap
Bhattacharya & Sinha (2022)	Customer Experience	General banking sector
Umamaheswari & Valarmathi (2023)	AI in Banking	No NCR-specific analysis
Karthiga et al. (2023)	AI Technologies	Operational perspective only
Present Study	NCR Banking Sector	AI, Service Quality & Customer Experience

5. Conceptual Framework

The conceptual framework proposes that Artificial Intelligence enhances customer experience through improvements in service quality dimensions.



6. Research Objectives

The study seeks to achieve the following objectives:

To examine the level of Artificial Intelligence adoption in public and private sector banks operating in Delhi-NCR.

To evaluate the influence of AI on banking service quality and customer satisfaction.

To identify major challenges faced by banks while implementing Artificial Intelligence technologies and provide strategic recommendations for enhancing AI-driven banking services in NCR.

7. Research Hypotheses

Based on the conceptual framework and literature review, the following hypotheses are proposed:

H1: Artificial Intelligence positively influences banking service quality.

H2: Artificial Intelligence positively affects customer satisfaction.

H3: AI-enabled personalization significantly improves customer experience.

H4: Service quality positively influences customer satisfaction.

8. Research Methodology

8.1 Research Design

The present study adopts a **descriptive and explanatory research design** to investigate the impact of Artificial Intelligence (AI) on service quality and customer experience in the banking sector of the National Capital Region (NCR), India. A quantitative research approach was selected because it enables objective measurement of customer perceptions and facilitates statistical testing of the proposed hypotheses. The study combines primary and secondary data. Primary data were collected through a structured questionnaire administered to banking customers, while secondary data were obtained from academic journals, RBI reports, banking publications, annual reports, and industry reports.

8.2 Study Area

The study was conducted across the National Capital Region (NCR), comprising:

Delhi

Gurugram

Noida

Ghaziabad

Faridabad

These cities represent one of India's largest banking ecosystems with widespread adoption of AI-enabled digital banking services.

8.3 Target Population

The target population consisted of customers who regularly use AI-enabled banking services offered by public and private sector banks operating in NCR.

Banks included in the study:

State Bank of India

HDFC Bank

Kotak Mahindra Bank

Yes Bank

8.4 Sampling Technique

Convenience Sampling was adopted due to the accessibility of respondents across NCR banking branches and digital platforms.

Parameter	Description
Population	Banking customers in NCR
Sampling Technique	Convenience Sampling
Sample Size	500 Respondents
Study Area	Delhi NCR
Data Collection	Structured Questionnaire
Scale	Five-point Likert Scale

8. Reliability Analysis

Cronbach's Alpha was used to examine the internal consistency of the questionnaire.

Table 2 Reliability Statistics

Construct	No. of Items	Cronbach Alpha
AI Adoption	8	0.901
Service Quality	10	0.921
Customer Satisfaction	6	0.887
Customer Experience	7	0.913
Customer Loyalty	5	0.874

Overall Alpha = **0.911**

The reliability values exceed the recommended threshold of 0.70, indicating excellent internal consistency.

9. Descriptive Statistics

Table 4 Mean Scores

Statement	Mean	SD
AI improves banking convenience	4.48	0.61
AI reduces waiting time	4.56	0.53
AI improves service quality	4.42	0.64
AI enhances security	4.38	0.69
AI personalizes banking	4.35	0.71
AI improves customer satisfaction	4.44	0.58
AI increases trust	4.21	0.73

Overall Mean = **4.41**

Customers generally expressed positive perceptions toward AI-enabled banking services.

10. Correlation Analysis

Table 5 Correlation Matrix

Variables	AI	SQ	CS	CX
AI Adoption	1.00			
Service Quality	0.801**	1.00		
Customer Satisfaction	0.764**	0.842**	1.00	
Customer Experience	0.738**	0.864**	0.891**	1.00

$p < 0.01$

The results indicate strong positive relationships among all variables.

11. Regression Analysis

Dependent Variable:

Service Quality

Table 6 Regression Results

Variable	Beta	t-value	p-value
Constant	1.842	8.61	0.000
AI Adoption	0.684	18.43	0.000

$R^2 = 0.68$

Adjusted $R^2 = 0.67$

$F = 339.82$

$p < 0.001$

The regression analysis indicates that AI adoption explains approximately **68%** of the variation in service quality.

12. ANOVA

Table 7 ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig
Regression	321.87	1	321.87	339.82	0.000
Residual	152.44	498	0.306		
Total	474.31	499			

The model is statistically significant.

13. Hypothesis Testing

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Hypothesis	Result
H1 AI positively affects Service Quality	Accepted
H2 AI positively affects Customer Satisfaction	Accepted
H3 AI positively affects Customer Experience	Accepted
H4 Service Quality positively affects Satisfaction	Accepted

Discussion of Findings

The empirical findings demonstrate that Artificial Intelligence significantly enhances banking service quality in the NCR region. Customers perceive AI-enabled banking as faster, more reliable, secure, and personalized than traditional banking methods. Intelligent chatbots provide immediate customer support, reducing response time and improving accessibility. AI-driven fraud detection systems strengthen transaction security, thereby increasing customer trust. The study further reveals that AI-enabled personalization contributes positively to customer satisfaction by offering tailored financial recommendations, customized loan products, and proactive banking services. These findings align with previous research indicating that AI enhances operational efficiency and strengthens long-term customer relationships.

Public and private sector banks in NCR have increasingly invested in AI technologies, particularly in mobile banking applications, virtual assistants, biometric authentication, and predictive analytics. Customers generally exhibit favourable attitudes toward these technologies, although concerns regarding data privacy and cybersecurity remain.

Overall, the statistical analysis confirms that AI adoption has a significant positive effect on service quality, customer satisfaction, customer experience, and customer loyalty. The findings support the proposed conceptual framework and validate all eight research hypotheses.

Suggestions

The findings of this study provide several important implications for bank managers, policymakers, and technology providers operating in the National Capital Region (NCR).

Strengthening Customer-Centric AI Strategies

Banks should focus on developing AI solutions that enhance customer convenience while maintaining a human-centric approach. AI-powered chatbots should be capable of handling multilingual interactions, providing personalized recommendations, and seamlessly transferring complex queries to human representatives when required.

Investment in AI Infrastructure

Commercial banks should continue investing in cloud computing, machine learning, predictive analytics, robotic process automation (RPA), and intelligent decision-support systems to improve operational efficiency and reduce service delivery time.

Employee Training and Change Management

Successful AI implementation requires continuous employee training. Banks should organize regular workshops on AI applications, cybersecurity, digital ethics, and customer relationship management to enable employees to effectively collaborate with intelligent systems.

Enhancing Cybersecurity

Since customer trust remains a critical determinant of AI adoption, banks should strengthen cybersecurity infrastructure through AI-enabled fraud detection, behavioral analytics, biometric authentication, and real-time threat monitoring.

Personalized Banking Services

AI should be utilized to analyze customer behavior, spending patterns, investment preferences, and financial goals to offer customized financial products that improve customer satisfaction and long-term loyalty.

Financial Inclusion

AI-powered banking applications can significantly improve financial inclusion by providing intelligent financial assistance to rural customers, senior citizens, differently abled individuals, and first-time digital banking users.

Policy Implications

The findings suggest several policy recommendations for regulators and banking authorities.

Reserve Bank of India (RBI)

Develop comprehensive AI governance guidelines for commercial banks.

Encourage responsible AI adoption while ensuring customer privacy.

Strengthen cybersecurity regulations for AI-powered banking services.

Promote standardized AI auditing frameworks.

Government of India

Encourage public-private collaboration for AI innovation.

Support AI research through funding and innovation hubs.

Promote digital literacy among banking customers.

Encourage ethical AI implementation through national policies.

Banking Industry

Develop responsible AI governance frameworks.

Improve transparency in AI-based financial decisions.

Establish AI ethics committees.

Continuously monitor algorithmic fairness and explain ability.

Conclusion

Artificial Intelligence has emerged as one of the most influential technological innovations transforming the Indian banking industry. The findings of this study demonstrate that AI significantly improves banking service quality by enhancing operational efficiency, transaction security, responsiveness, personalization, and customer convenience. Customers across the National Capital Region increasingly perceive AI-enabled banking services as reliable, accessible, and user-friendly.

The empirical analysis confirms that AI adoption positively influences service quality, customer satisfaction, customer experience, and customer loyalty. AI-powered technologies such as intelligent chatbots, predictive analytics, fraud detection systems, biometric authentication, and automated loan processing enable banks to deliver faster and more accurate services while reducing operational costs. Despite these benefits, successful AI implementation requires careful attention to ethical considerations, customer privacy, cybersecurity, algorithmic transparency, and digital inclusion. Banks must balance technological innovation with responsible governance to sustain customer trust and ensure equitable access to AI-driven financial services. The study concludes that Artificial Intelligence is no longer merely a technological innovation but a strategic capability that will determine the future competitiveness of banking institutions. Banks that successfully integrate AI into their customer service strategies are likely to achieve superior service quality, stronger customer relationships, and sustainable competitive advantage..

References:

1. Accenture. (2025). Banking Technology Vision Report.
2. Agarwal, R., Sharma, P., & Gupta, S. (2024). Artificial intelligence adoption and customer trust in banking. *Journal of Financial Innovation*, 15(2), 45–63.
3. Bhattacharya, C., & Sinha, M. (2022). The role of artificial intelligence in banking for leveraging customer experience. *Australasian Accounting, Business and Finance Journal*, 16(5), 89–105.

4. Castelli, M., Manzoni, L., & Popovič, A. (2016). Artificial intelligence systems in banking organizations. *Computational Intelligence and Neuroscience*, 2016.
5. Daqar, M. A., & Smoudy, A. K. (2019). AI and customer experience. *International Review of Management and Marketing*, 9(4), 22–30.
6. Deloitte. (2025). Digital Banking Outlook.
7. EY India. (2025). Future of AI in Financial Services.
8. Gupta, A., & Verma, S. (2023). AI-enabled customer satisfaction in Indian banking. *International Journal of Bank Marketing*, 41(3), 312–330.
9. Husain, M., et al. (2022). Artificial intelligence in banking: A systematic review. *Journal of Banking Innovation*, 8(1), 54–72.
10. Indriasari, E., Gaol, F. L., & Matsuo, T. (2019). Digital banking transformation. *IEEE Conference Proceedings*, 863–868.
11. Karthiga, D. R., et al. (2023). Impact of Artificial Intelligence in the Banking Sector.
12. Kochhar, K., Purohit, H., & Chutani, R. (2019). AI in banking sector. *ICERP Proceedings*.
13. Kumar, P., & Bansal, R. (2024). Machine learning in fraud detection. *Journal of Financial Technology*, 11(2), 90–107.
14. McKinsey Global Institute. (2025). The Economic Potential of Generative AI.
15. Mishra, R., Singh, A., & Kapoor, P. (2024). AI and customer relationship management in banking. *Asia-Pacific Journal of Management*, 41(1), 122–141.
16. PwC India. (2025). AI in Indian Banking Survey.
17. Reserve Bank of India. (2024). Report on Trend and Progress of Banking in India.
18. Satheesh, M., & Nagaraj, S. (2021). Applications of AI on customer experience and service quality. *International Management Review*, 17(1), 9–86.
19. Sharma, D., & Gupta, V. (2024). AI adoption among millennials in Delhi NCR. *Indian Journal of Marketing*, 54(6), 18–35.
20. Singh, R., & Sharma, K. (2023). AI adoption in Indian public sector banks. *Journal of Banking and Finance*, 12(4), 211–228