IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

The Impact Of Artificial Intelligence On Customer Experience And Risk Management In The Banking Sector: A Review Study.

Arpita Das

Master of Commerce, Department of Commerce, Rama Devi Women's University, Bhubaneswar, India.

Abstract

Artificial Intelligence (AI) has become a cornerstone of transformation in the banking sector, particularly in enhancing customer experience and strengthening risk management. This review synthesizes findings from 50 scholarly works published between 2012 and 2026, providing a comprehensive perspective on AI's dual impact. On the customer side, AI-driven tools such as chatbots, robo-advisors, voice assistants, and personalization engines have reshaped service delivery by improving accessibility, engagement, and loyalty. Mobile banking applications and predictive analytics further enable hyper-personalized interactions, fostering trust and satisfaction. In risk management, machine learning and deep learning models significantly outperform traditional approaches in fraud detection, credit scoring, and compliance monitoring, achieving higher accuracy and reducing operational costs. AI-powered Reg-Tech solutions automate KYC and AML processes, minimizing human error and ensuring regulatory compliance. Case studies across diverse regions demonstrate measurable improvements in efficiency, fraud prevention, and customer retention. Despite these benefits, challenges persist, including data privacy risks, algorithmic bias, regulatory fragmentation, and workforce adaptation. The literature emphasizes that sustainable adoption requires balancing innovation with ethical governance, transparency, and trust-building. Overall, AI is indispensable for modern banking, simultaneously optimizing internal operations and elevating customer engagement, while underscoring the need for responsible integration to ensure competitiveness and long-term resilience.

Keywords: *Artificial Intelligence, Reg-Tech, Chatbots, KYC, AML, Sustainable adoption.*

1. Introduction

Artificial Intelligence (AI) has become a pivotal driver of digital transformation in the banking sector, with scholars consistently highlighting its dual role in enhancing customer experience and strengthening risk management. Tian (2024) emphasized AI's ability to improve customer loyalty through tailored services and chatbots, while reducing costs via automation and predictive analytics. Satish and Nagaraj (2021) similarly noted that AI streamlines processes such as credit scoring, fraud detection, and liquidity risk assessment, outperforming traditional statistical methods. Sarkar and Rahman (2025) advanced this view, showing how deep learning models enhance anomaly detection and how Reg-Tech tools automate KYC and AML checks, reducing compliance costs. Kovvuri (2024) reported detection rates above 95%

in fraud prevention, while Shafi et al. (2023) illustrated AI's contribution to multi-channel customer journeys and payment security. Gottipati (2024) highlighted measurable benefits such as reduced call centre workloads and improved portfolio performance, whereas Oluwaseun (2025) emphasized AI's role in real-time monitoring and regulatory reporting. Despite these advances, challenges remain, including data privacy risks, algorithmic bias, regulatory fragmentation, and workforce adaptation (Grover & Dubey, 2024; Oyeniyi et al., 2024). Collectively, the literature positions AI as indispensable for modern banking, but stresses that sustainable adoption requires balancing innovation with ethical governance, transparency, and trust-building.

2. Objectives

1. To synthesize existing literature on the role of Artificial Intelligence (AI) in enhancing customer experience and risk management in banking.
2. To evaluate the effectiveness of AI-driven tools and applications in improving customer satisfaction, loyalty, fraud detection, credit scoring, and compliance monitoring.
3. To identify key challenges and future directions for sustainable and ethical AI adoption in the banking sector.

3. Literature Review

Phase I (2012–2016): Foundations of Service Quality and Early AI Applications: The first phase of literature, spanning 2012 to 2016, laid the groundwork for understanding how service quality and customer satisfaction shaped loyalty in the banking sector, while also introducing the earliest applications of artificial intelligence (AI). Tu and Wang (2012) examined corporate brand image in Taiwan's retail sector, finding that a positive brand image significantly influenced both satisfaction and loyalty. Their study highlighted how perception and trust were central to customer relationships, setting the stage for later discussions on technology-enabled personalization. Similarly, Ngo and Nguyen (2016) in Vietnam and Naeem et al. (2011) in Pakistan confirmed that service quality was a strong predictor of satisfaction and loyalty, though outcomes varied across private and public sector banks. These studies emphasized that excellent service processes were critical for retention, even in developing economies. Castelli (2016) marked a turning point by introducing an AI-based system using geometric semantic genetic programming to predict service quality in banks. By analysing transaction records and customer surveys, the model optimized counter allocation, balancing efficiency with satisfaction. This innovation reflected the earliest attempts to move beyond traditional service models toward technology-enabled efficiency. Overall, this phase established the conceptual link between customer experience and technological innovation, while AI adoption remained limited, experimental, and focused on operational improvements rather than holistic transformation.

Phase II (2017–2022): Expansion and Integration of AI in Banking: The second phase, covering 2017 to 2022, witnessed a rapid expansion of AI adoption in banking, with machine learning, chatbots, and predictive analytics reshaping customer experience and operational efficiency. Somu (2020) highlighted how machine learning applications enabled hyper-personalization, fraud detection, and sentiment analysis, thereby reducing churn and enhancing trust. Techniques such as supervised learning for fraud detection, unsupervised learning for segmentation, and reinforcement learning for adaptive personalization demonstrated the versatility of AI in addressing diverse banking challenges. Prentice and Nguyen (2020) explored the interplay between AI tools and human service in the Australian hotel industry, showing that while AI enhanced efficiency and convenience, customers still preferred human interaction. Emotional intelligence was found to moderate engagement outcomes, suggesting that AI adoption must complement rather than replace human service. Regional studies enriched this phase:

Bhattacharya and Sinha (2022) examined Indian banks, finding chatbots to be the most impactful AI tool for improving satisfaction and loyalty, while Al-Araj et al. (2022) confirmed AI's positive effect on service quality in Jordanian banks using an updated SERVQUAL model. El Gohary et al. (2021) revealed limited customer preference for chatbots in England, highlighting adoption challenges and the need for stronger communication and trust. Meanwhile, Vergallo and Mainetti (2022) conducted a systematic mapping study of 89 primary works, noting fragmented research but identifying technologies such as biometrics, blockchain, and AI as central to customer experience innovation. Collectively, this phase reflected the integration of AI into front-office functions (chatbots, voice assistants), middle-office processes (loan processing, compliance), and back-office operations (fraud detection, risk monitoring). It also marked the emergence of ethical concerns, including privacy, bias, and customer readiness, as banks sought to balance efficiency with trust and inclusivity.

Phase III (2023–2026): Consolidation, Advanced Applications, and Ethical Governance: The third phase, spanning 2023 to 2026, consolidated AI as indispensable for banking competitiveness, with emphasis shifting toward advanced applications, regulatory compliance, and ethical governance. Kalyani and Gupta (2023) conducted a meta-analysis of 734 studies, confirming AI/ML as central to Banking 4.0 and highlighting applications across fraud detection, credit scoring, robotic process automation, and digital inclusion. Shafi et al. (2023) emphasized AI's role in fostering customer loyalty through seamless multi-channel experiences, while Tulcanaza-Prieto et al. (2023) examined customer perception factors in Ecuador, showing that convenience, personalization, trust, and satisfaction all positively influenced AI-enabled customer experience. Tian (2024), Kovvuri (2024), and Gottipati (2024) documented fraud detection rates above 95%, predictive analytics for risk management, and personalization engines that boosted retention, underscoring AI's dual role in efficiency and customer engagement. Global syntheses by Oyeniyi et al. (2024) and Grover & Dubey (2024) highlighted ethical governance and transparency as critical for sustainable adoption, while comparative analyses revealed regional differences shaped by regulatory frameworks and market needs. By 2025, Sarkar & Rahman, Oluwaseun, and Swamy advanced discussions on Reg-Tech automation, compliance monitoring, and conversational AI, stressing challenges of bias, privacy, and explainability. These studies emphasized the need for explainable AI, federated learning, and collaborative frameworks to ensure fairness and accountability. The literature increasingly framed AI not only as a technological enabler but also as a governance challenge, requiring banks to embed ethics, transparency, and sustainability into digital transformation strategies. This phase marked a decisive shift from proving AI's utility to ensuring responsible adoption, aligning innovation with trust, regulatory compliance, and long-term stability in financial systems.

4. Research Gap

Although extensive studies between 2012 and 2026 highlight the transformative role of Artificial Intelligence (AI) in banking—improving customer experience through chatbots, personalization engines, and mobile applications, and strengthening risk management via fraud detection, credit scoring, and compliance monitoring—important gaps remain. Most research treats customer experience and risk management separately, with limited integration into a unified framework. Evidence is concentrated in developed economies, leaving emerging markets underexplored. Ethical concerns such as data privacy, algorithmic bias, and explainability are acknowledged but rarely addressed through practical governance models. Furthermore, studies are largely cross-sectional, lacking longitudinal insights into AI's long-term impact on loyalty and resilience. Human–machine collaboration also remains underdeveloped, underscoring the need for integrated, context-specific, and ethically grounded research.

5. Conclusion

The review of fifty studies from 2012 to 2026 demonstrates that Artificial Intelligence (AI) has become central to the transformation of the banking sector, particularly in enhancing customer experience and strengthening risk management. AI-driven tools such as chatbots, robo-advisors, personalization engines, and predictive analytics have improved accessibility, personalization, and customer loyalty, while advanced machine learning and deep learning models have significantly enhanced fraud detection, credit scoring, and compliance monitoring. Despite these benefits, challenges including data privacy, algorithmic bias, regulatory fragmentation, and workforce adaptation persist. The literature emphasizes that sustainable adoption requires balancing innovation with ethical governance, transparency, and trust-building. Overall, AI is indispensable for creating resilient, customer-centric, and competitive financial systems.

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