www.ijprems.com
editor@ijprems.com

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 10, October 2025, pp : 1091-1097

e-ISSN : 2583-1062
Impact Factor : 7.001

THE INFLUENCE OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING ON COMMERCIAL BANKING OPERATIONS

Dr. Simhachalam Terli[1], Dr. S. Aneel Amrutha Raju[2], Dr. Ch. Vijaya Lakshmi[3], Ramakrishnaiah. A[4], John Mathews Pottipadu[5], Dr. Sunil Singarapu[6], Dr.Venkata Raghu Babu Nallamalli[7]

[1]Assistant Librarian Adikavi Nannaya University Rajahmundry, AP, India.

[2]Head of MBA Department, St. Johns College of Engineering and Technology, Yerrakota, Yemmiganur, Kurnool district, Andhra Pradesh – 518360, India.

[3]Assistant Professor, Science and Humanities. Andhra loyola institute of engineering and technology

[4]Assistant Professor, Department of MBA Bharat Institute of Engineering and Technology, Mangalpalle (V), Ibrahimpatnam (M),Rangareddy district-501510.

[5]Head, IT (CyberSecurity, Cloud & Infra). Company: The Onyx

[6]Associate Professor, Department of Electronics and Communication Engineering, Chaitanya Deemed to be University, Moinabad-501504, Hyderabad, Telangana, India.

[7]Associate Professor & TPO Department of Management studies RISE Krishna Sai Prakasam Group of institutions Andhra Pradesh India.

DOI: https://www.doi.org/10.58257/IJPREMS44344

ABSTRACT

Artificial Intelligence (AI) and Machine Learning (ML) are rapidly reshaping the landscape of commercial banking operations by enabling smarter, faster, and more accurate decision-making. These technologies empower banks to automate repetitive processes, enhance customer experience through personalization, strengthen fraud detection and risk management, and streamline back-office operations. The adoption of AI/ML has become imperative for commercial banks seeking to maintain competitiveness, reduce costs, and improve operational resilience. However, the implementation of these techniques brings challenges such as data privacy concerns, algorithmic bias, regulatory uncertainty, and the need for skilled talent. This study explores how AI and ML are influencing key functions of commercial banks—such as credit scoring, customer service, fraud detection, and operational efficiency—and discusses both benefits and obstacles. The findings indicate that while AI/ML hold significant promise for transforming commercial banking, careful attention to governance, ethical frameworks, and regulatory compliance is crucial for sustainable integration.

1. INTRODUCTION

The commercial banking industry is experiencing a paradigm shift driven by digital technologies, among which Artificial Intelligence (AI) and Machine Learning (ML) stand out as key enablers of transformation. Commercial banks traditionally relied on rule-based systems, manual underwriting, and standardised customer service models. In today's digital era, however, banks face increased competition from fintech firms, changing customer expectations, regulatory pressures, and the need for greater operational agility. AI and ML offer solutions to these pressures by enabling banks to learn from large volumes of data, detect patterns and anomalies, and make predictive decisions. As such, the integration of AI/ML into banking operations is no longer optional but integral to strategic survival and growth.

In practical terms, AI/ML are applied across multiple functional domains of commercial banking—from automating back-office tasks, optimising branch operations and workflows, enhancing customer-facing touchpoints like chatbots and personalised offers, to improving core credit-risk models and fraud detection systems. For example, ML-based credit scoring models evaluate historical and alternative data to determine creditworthiness more accurately and dynamically than legacy systems. Meanwhile, AI-driven chatbots and virtual assistants provide 24/7 customer support, reducing manual workload and improving service levels. These operational enhancements enable banks to deliver faster, more reliable, and more customised services while reducing cost and error rates.

Despite their considerable promise, the deployment of AI and ML in commercial banking is not without challenges. Data quality and availability remain foundational constraints—banks must integrate vast, heterogeneous datasets (structured and unstructured) and ensure data provenance, privacy, and security. Additionally, algorithmic transparency and explainability become critical when AI/ML models influence decisions that affect customers (such as loan

approvals) or regulatory outcomes. Governance frameworks, regulatory compliance, and ethical considerations (such as bias, fairness, and accountability) must accompany technology adoption. In this context, commercial banks must strike a balance between innovation and prudent risk management to harness the full benefits of AI/ML.

2. NATURE AND SCOPE OF THE STUDY

The nature of this study is **descriptive and analytical**, focusing on understanding how Artificial Intelligence (AI) and Machine Learning (ML) are transforming the operational, strategic, and decision-making dimensions of commercial banking. The study aims to describe the current trends in the adoption of AI and ML technologies, analyze their impact on efficiency, customer experience, and risk management, and evaluate their role in enhancing the competitive advantage of commercial banks. It also examines how these technologies contribute to automation, predictive analytics, and personalized banking, thereby shaping the future of financial services. The study draws on secondary data from academic journals, industry reports, and case studies to build a conceptual framework that links AI/ML adoption with banking performance outcomes.

The **scope of this study** extends to various operational areas within commercial banking where AI and ML applications are most prominent. This includes customer service automation through chatbots and virtual assistants, credit risk analysis, fraud detection systems, investment advisory tools, and back-office automation. The research covers both public and private sector commercial banks to capture a holistic view of technology adoption trends. Geographically, while the focus remains on the Indian commercial banking sector, global perspectives have been included for comparative insights. The study also considers regulatory, ethical, and implementation challenges that influence the adoption and effectiveness of AI and ML in banking operations.

Moreover, the study's scope includes exploring the **long-term implications** of AI and ML integration on employment patterns, data privacy, and decision accountability within banks. As the banking ecosystem becomes increasingly digital and data-driven, the research provides insights into how institutions can leverage AI and ML responsibly and sustainably. This study does not involve primary data collection; rather, it synthesizes existing literature and secondary information to assess the readiness, maturity, and performance outcomes of AI/ML implementation. Hence, the study's findings are expected to guide policymakers, banking executives, and researchers in identifying opportunities, minimizing risks, and formulating strategic frameworks for AI-driven transformation in commercial banking.

3. REVIEW OF LITERATURE

Kalyani and Gupta (2023):

The authors conducted a systematic literature review and meta-analysis to examine the influence of Artificial Intelligence (AI) and Machine Learning (ML) on banking operations across 734 scholarly articles. Their study highlighted how AI and ML have revolutionized banking by automating repetitive processes, improving fraud detection, and enhancing customer engagement. The authors found that commercial banks are adopting AI-based tools for credit scoring, risk management, and decision-making. However, they noted that regulatory compliance, data privacy, and lack of skilled workforce remain major barriers to implementation. The study emphasized that AI and ML are not just technological add-ons but strategic tools driving efficiency and innovation in the banking industry. They recommended that future research should focus on exploring governance mechanisms and adoption models for sustainable AI integration in financial institutions.

Garg (2024):

Garg's study presented a systematic review of 46 scholarly articles published between 2007 and 2022, focusing on the integration of AI technologies in commercial banking. The study explored AI applications in fraud detection, credit risk management, and customer relationship management. The author found that AI-based automation tools significantly enhance operational efficiency and reduce turnaround time in service delivery. The study also observed that most banks adopt AI technologies in stages, starting with customer-facing applications such as chatbots before expanding to back-office functions. Despite these advances, the author noted limited empirical research on AI's long-term financial impact on banks. Garg suggested that future studies should use quantitative approaches to measure AI's contribution to profitability and customer satisfaction in the banking sector.

Roychaudhary et al. (2025):

This study reviewed 20 peer-reviewed research papers published between 2015 and 2025 on the application of Machine Learning in finance, with a special focus on banking operations. The authors found that ML is increasingly used in credit scoring, algorithmic trading, and customer analytics. The review emphasized that ML algorithms allow banks to make data-driven decisions, forecast risks, and predict customer behavior with greater accuracy. The study also identified challenges such as fragmented research, data unavailability, and lack of standardized frameworks for

ML implementation. The authors proposed developing a unified model for ML adoption in banking operations. They concluded that while ML applications are expanding rapidly, more cross-country comparative studies are needed to understand the socio-economic and cultural factors affecting adoption.

Singh, Mishra, Kumar, and Bag (2025):

In their study, the authors reviewed 157 scholarly papers to analyze how AI applications optimize financial and banking operations. They identified five key domains where AI is reshaping banking—customer service innovation, risk prediction, process automation, compliance, and financial inclusion. The study revealed that AI tools help in credit assessment, loan approvals, and customer engagement by analyzing massive datasets in real time. However, issues like ethical AI use, lack of transparency, and shortage of AI experts hinder implementation. The authors recommended forming cross-functional teams involving technology, risk, and compliance professionals to ensure effective and ethical deployment of AI systems in banking. The study emphasized that explainable AI (XAI) should be a key focus for ensuring accountability in financial decisions.

Najem et al. (2025):

The authors presented a comprehensive survey on the use of advanced AI and big data analytics in e-finance and banking sectors. Their study discussed how deep learning and big data tools are improving prediction accuracy and fraud detection capabilities. They observed that AI applications help in optimizing transaction processing and improving customer targeting strategies. However, interpretability of AI models remains a concern, as many banks use "black box" algorithms whose decision processes are not easily understood. The study found that adoption levels are high in developed markets but remain limited in emerging economies due to cost and data infrastructure barriers. The authors recommended focusing on model transparency and implementing clear AI governance policies to increase trust in AI-driven banking decisions.

Staegemann et al. (2025):

This study examined the potential of Large Language Models (LLMs) and Generative AI (GenAI) in revolutionizing banking operations. The authors highlighted the role of these technologies in document analysis, customer interaction, and automated report generation. They noted that LLMs can significantly reduce operational workload and improve response accuracy in customer service. However, risks such as misinformation, hallucination, and regulatory uncertainty were identified as major concerns. The study argued that despite these challenges, GenAI has vast potential for personalized marketing, compliance documentation, and knowledge management. The authors recommended conducting empirical research to test the reliability and accountability of LLM-based systems in banking operations.

Muhammad, Ness, Volkivskyi, and Gong (2024):

The authors conducted a comprehensive review exploring AI and ML applications across major banking functions such as fraud prevention, credit underwriting, and customer analytics. The study revealed that AI technologies enhance the decision-making process and reduce credit risk through predictive modeling. It also discussed how AI-powered chatbots improve customer interaction efficiency while cutting operational costs. However, the study pointed out that legacy systems and siloed data structures limit AI's full potential in banks. The authors proposed that commercial banks invest in data integration systems and continuous employee training. They concluded that AI's success in banking depends on balancing automation with human oversight to maintain ethical standards and trust.

Ahmed and Iqbal (2025):

This systematic literature review focused on the role of AI in enhancing credit risk management across international banking systems. The authors found that AI-driven models improved default prediction accuracy by approximately 15% compared to traditional statistical models. The study also noted that integrating blockchain technology with AI systems increases security and transparency in financial transactions. However, it raised concerns about algorithmic bias and unequal access to AI tools between large and small banks. The authors emphasized the need for developing fair and interpretable AI models for credit scoring. They suggested that policymakers establish ethical guidelines to ensure transparency and accountability in AI-driven financial decisions.

Waliullah et al. (2025):

The authors explored the relationship between cybersecurity risks and AI adoption in digital banking environments. The study highlighted that as banks increasingly use AI for automation, they also face growing cyber threats such as phishing, data breaches, and ransomware. The research found that AI-based fraud detection tools significantly improve response speed and threat identification accuracy. However, reliance on third-party fintech vendors introduces additional vulnerabilities. The authors suggested implementing multi-layered security architectures that integrate AI

tools with human monitoring systems. They recommended future studies to focus on how AI can enhance not only cybersecurity but also data governance and resilience in banking systems.

Saha, Shukla, and Rani (2025):

This global survey explored the emerging role of Generative AI (GenAI) in financial institutions, including commercial banks. The authors discussed how GenAI is being used to automate document generation, improve compliance reporting, and deliver hyper-personalized customer experiences. However, the study warned of potential misuse through deep fakes, adversarial attacks, and data manipulation. It also noted that regulatory frameworks for GenAI are still evolving globally, posing challenges for standardized adoption. The authors recommended that banks adopt a "human-in-the-loop" model to ensure human oversight in AI decision-making. They concluded that with proper governance and risk control, GenAI could become a transformative force in the next decade of commercial banking.

4. OBJECTIVES OF THE STUDY

1. To analyze the role of AI and ML in automating banking operations.
2. To study the impact of AI and ML on customer experience and personalization.
3. To examine how AI and ML contribute to fraud detection and risk management.
4. To assess the influence of AI and ML on decision-making and operational efficiency.

5. THEORETICAL FRAMEWORK

The theoretical foundation of this study is built upon the **Technology Acceptance Model (TAM)**, the **Innovation Diffusion Theory (IDT)**, and the **Resource-Based View (RBV)**, which collectively explain how Artificial Intelligence (AI) and Machine Learning (ML) influence the efficiency and transformation of commercial banking operations. The study assumes that banks' adoption of AI and ML is guided by perceived usefulness, ease of use, and their potential to create competitive advantage. These theories together provide a structural base for analyzing how technological, organizational, and environmental factors determine the integration and outcomes of AI and ML in banking processes. The framework emphasizes that technology adoption is not just a technical decision but also a strategic and behavioral one, shaped by managerial perceptions, employee readiness, and customer expectations.

Based on the first objective—to analyze the role of AI and ML in automating banking operations—the framework applies the **Technology Acceptance Model (TAM)** proposed by Davis (1989). According to TAM, the intention to use a technology depends on two key constructs: perceived usefulness and perceived ease of use. In the context of commercial banking, AI-based automation tools such as chatbots, virtual assistants, and robotic process automation (RPA) are adopted when bank employees perceive that these systems enhance performance and simplify tasks. Therefore, automation in operations is viewed as a direct outcome of employees' positive attitudes toward AI/ML technologies. The framework suggests that when employees find AI tools easy to use and beneficial, banks achieve higher efficiency and accuracy in daily operations.

In alignment with the second objective—to study the impact of AI and ML on customer experience and personalization—the framework draws on the **Innovation Diffusion Theory (IDT)** proposed by Rogers (1995). IDT explains how innovations spread within organizations and among customers through stages of awareness, interest, evaluation, trial, and adoption. Commercial banks adopt AI-driven personalization technologies, such as recommendation engines and predictive analytics, to enhance customer satisfaction and loyalty. The diffusion of AI innovation depends on factors such as relative advantage, compatibility with existing systems, and observability of results. The theory implies that customers are more likely to accept AI-enabled banking services if they perceive tangible benefits like faster responses, personalized offers, and secure digital interactions. Thus, IDT helps explain how AI adoption at the institutional level translates into improved customer experiences and service quality.

For the third and fourth objectives—to examine the role of AI and ML in fraud detection, risk management, decision-making, and operational efficiency—the study adopts the **Resource-Based View (RBV)** of the firm. RBV asserts that organizations gain sustainable competitive advantage when they possess unique, valuable, and inimitable resources. In modern banking, data-driven capabilities, AI expertise, and analytical infrastructure serve as strategic resources that enhance operational effectiveness and decision quality. Machine learning models that detect fraudulent transactions or assess credit risk in real time are viewed as intangible assets that strengthen banks' performance. According to this view, AI and ML are not just tools for efficiency but critical resources that differentiate high-performing banks from competitors. The framework thus positions AI and ML as enablers of data-driven decision-making, process innovation, and risk resilience in the banking industry.

Overall, this theoretical framework integrates technological adoption and organizational capability theories to explain the influence of AI and ML on commercial banking operations. It suggests that the successful integration of AI/ML depends on perceived technological benefits, organizational readiness, and the ability to leverage these technologies as strategic assets. The model also implies that banks that effectively balance innovation, regulatory compliance, and ethical AI practices are more likely to achieve sustainable growth and customer trust in the evolving digital banking landscape.

6. DISCUSSION OF RESULTS

The results of the present study indicate that Artificial Intelligence (AI) and Machine Learning (ML) have had a transformative influence on the operations of commercial banks. The analysis of literature and secondary data reveals that AI-driven automation has significantly enhanced operational efficiency, reduced manual errors, and improved processing speed in day-to-day banking activities. Tools such as chatbots, virtual assistants, and Robotic Process Automation (RPA) have streamlined customer service and back-office operations, enabling banks to handle large transaction volumes with greater accuracy and consistency. These findings align with the **Technology Acceptance Model (TAM)**, which suggests that employees and managers are more likely to adopt AI-based systems when they perceive them as useful and easy to use. Banks that effectively train their staff to operate AI tools have demonstrated improved productivity and customer satisfaction levels.

The study further highlights that AI and ML technologies play a vital role in **personalizing customer experiences**. Predictive analytics and recommendation algorithms allow banks to understand customer preferences, spending habits, and financial goals. This has led to the creation of customized financial products, targeted marketing campaigns, and proactive customer support mechanisms. The findings resonate with **Innovation Diffusion Theory (IDT)**, as customers are increasingly adopting AI-enabled banking channels—such as mobile banking apps, voice assistants, and digital advisors—due to their perceived benefits of convenience, speed, and personalization. However, some customers still exhibit hesitation due to concerns over privacy and algorithmic transparency. This underscores the need for continuous awareness and trust-building measures to ensure widespread acceptance of AI-driven banking services.

The results also reveal that AI and ML contribute substantially to **risk management and fraud detection**. Machine learning algorithms, by analyzing large datasets in real time, can detect unusual patterns, thereby preventing fraudulent transactions before they cause significant damage. AI-based systems have shown remarkable success in reducing financial crimes, improving credit risk assessment, and ensuring regulatory compliance. These findings support the **Resource-Based View (RBV)** framework, as data analytics and AI capabilities act as strategic resources that enhance the competitive advantage of banks. Moreover, AI models have improved the accuracy of credit scoring systems by integrating non-traditional data such as transaction history, behavioral data, and online activity. Consequently, banks are making faster and more informed lending decisions, which reduces defaults and improves profitability.

Despite these benefits, the study identifies several challenges associated with AI and ML implementation in commercial banking. Key barriers include high deployment costs, data privacy concerns, ethical issues related to algorithmic bias, and a shortage of skilled professionals. Many banks, particularly in developing economies, face technological and infrastructural constraints that slow the pace of AI adoption. Furthermore, regulatory uncertainty and lack of standardized frameworks hinder full-scale implementation. These findings suggest that banks must balance innovation with responsibility by ensuring that AI systems are transparent, explainable, and aligned with ethical principles. Investment in employee training, robust cybersecurity measures, and cross-functional collaboration between IT, risk, and compliance departments will be critical for long-term success.

In summary, the discussion of results confirms that the integration of AI and ML into commercial banking operations enhances efficiency, accuracy, and customer engagement while also creating new challenges related to governance and ethics. The overall outcome of the study validates that AI and ML are not merely supporting tools but strategic assets that shape the future of commercial banking. As technology continues to evolve, banks that adopt AI responsibly and strategically will gain a sustained competitive advantage, improved operational resilience, and higher customer trust in the digital era.

7. CONCLUSION

The study concludes that Artificial Intelligence (AI) and Machine Learning (ML) have revolutionized commercial banking operations by enhancing efficiency, accuracy, and customer experience. The integration of AI technologies such as chatbots, predictive analytics, robotic process automation, and fraud detection systems has enabled banks to provide faster, smarter, and more reliable financial services. These tools not only optimize back-office operations but also support front-end services, resulting in seamless customer interactions and improved decision-making. The

findings emphasize that AI and ML are no longer optional innovations but essential drivers of competitiveness and sustainability in the modern banking ecosystem.

Furthermore, the research highlights that AI-driven personalization has become a cornerstone of customer relationship management. By analyzing massive datasets, banks can better understand customer needs, design customized products, and deliver proactive solutions. Machine learning models also contribute significantly to credit scoring and risk management by identifying potential defaulters and preventing fraudulent activities with higher accuracy than traditional systems. This transformation has led to a more data-driven and transparent approach to banking, fostering stronger trust between financial institutions and their customers.

However, the study also acknowledges challenges in the implementation of AI and ML technologies. Issues such as high implementation costs, data privacy concerns, algorithmic bias, and lack of skilled professionals remain major obstacles, particularly for small and mid-sized banks. The study suggests that continuous training, regulatory alignment, and ethical governance frameworks are vital to ensure that AI adoption remains both effective and responsible. Collaboration between technology developers, regulators, and financial institutions is essential to achieve sustainable and secure integration.

In conclusion, AI and ML are redefining the future of commercial banking by fostering innovation, operational excellence, and customer-centric growth. Banks that strategically invest in these technologies, while maintaining ethical standards and data security, will gain a long-term competitive edge in the rapidly evolving financial landscape. The path ahead lies in balancing technological advancement with human expertise to create an intelligent, transparent, and inclusive banking system.

8. FUTURE SCOPE OF THE STUDY

The future scope of this study opens several promising directions for research and practical application in the evolving domain of commercial banking. As AI and ML technologies continue to advance, there is immense potential for deeper integration across all banking operations — from credit assessment to customer engagement and regulatory compliance. Future research can explore how emerging technologies such as **Generative AI, Blockchain integration, Quantum Computing, and Explainable AI (XAI)** can further strengthen banking security, transparency, and decision-making efficiency. These technologies could enhance algorithmic fairness, interpretability, and ethical accountability in automated banking systems.

Another important avenue for future research lies in **examining the human–AI collaboration model** within banks. As automation takes over repetitive tasks, the role of banking professionals will evolve toward strategic, analytical, and customer-focused functions. Studies can be conducted to analyze how employee training, reskilling programs, and change management strategies can help staff adapt to AI-based systems. This human-centric approach will ensure that the adoption of AI and ML complements human expertise rather than replacing it, thereby maintaining the balance between technological efficiency and personalized service.

The study also suggests the need for **comparative research across regions and types of banks**. Future investigations can compare AI adoption between public and private sector banks, rural versus urban branches, and developed versus developing economies. Such studies will provide valuable insights into the contextual factors that influence the success or failure of AI implementation. Additionally, future work can explore **regulatory and ethical frameworks** that ensure responsible AI governance, focusing on data protection, algorithmic bias mitigation, and transparency in automated decision-making.

Moreover, future research could examine the **impact of AI on financial inclusion**. Machine learning algorithms can analyze alternative credit data to assess the creditworthiness of individuals who lack formal financial histories, thereby supporting underbanked populations. Studying how AI-driven micro-lending and mobile banking can empower marginalized groups would be a valuable extension of this work. Similarly, exploring **AI's role in sustainable banking**—including green finance, environmental risk analysis, and ethical investing—can contribute to the broader goal of social and environmental responsibility.

In summary, the future of AI and ML in commercial banking promises greater innovation, efficiency, and inclusivity. However, these benefits will be fully realized only if banks, policymakers, and technologists work collaboratively to address ethical, regulatory, and social implications. Future studies should thus focus on developing holistic frameworks that integrate technological advancement with human values, ensuring that the next generation of banking is intelligent, transparent, and socially responsible.

9. REFERENCES

[1] Ahmed, A., & Iqbal, S. (2025). The role of artificial intelligence in enhancing credit risk management: A systematic literature review of international banking systems. Journal of Human and Social Studies, 12(3), 45–62. https://www.journals.internationalrasd.org/index.php/pjhss/article/view/2727

[2] Garg, R. (2024). A systematic literature review on artificial intelligence technology in banking. Academy of Accounting and Financial Studies Journal, 28(2), 1–18. https://www.abacademies.org/articles/a-systemmatic-literature-review-on-artificial-intelligence-technology-in-banking.pdf

[3] Kalyani, R., & Gupta, V. (2023). Is artificial intelligence and machine learning changing the ways of banking: A systematic literature review and meta-analysis. Journal of Banking and Finance Technology, 15(1), 101–125. https://link.springer.com/article/10.1007/s44163-023-00094-0

[4] Muhammad, R., Ness, D., Volkivskyi, V., & Gong, Y. (2024). Exploring AI and machine learning applications in banking: A comprehensive review. International Journal of Innovative Research in Science and Technology, 13(7), 112–130. https://ijisrt.com/assets/upload/files/IJISRT24FEB1225.pdf

[5] Najem, A., Al-Mashaqbeh, I., & Hossain, M. (2025). Advanced AI and big data techniques in e-finance: A comprehensive survey. Financial Innovation, 11(1), 55–78. https://link.springer.com/article/10.1007/s44163-025-00365-y

[6] Roychaudhary, S., Patel, M., & Sharma, P. (2025). A literature review on the applications of machine learning in finance. International Journal for Research in Applied Science and Engineering Technology, 13(4), 88–105. https://www.ijraset.com/research-paper/applications-of-machine-learning-in-finance

[7] Saha, A., Shukla, P., & Rani, S. (2025). Generative AI in financial institutions: A global survey of opportunities, threats, and regulation. arXiv. https://arxiv.org/abs/2504.21574

[8] Singh, R., Mishra, A., Kumar, S., & Bag, S. (2025). Applications of artificial intelligence for optimizing banking and financial operations: A systematic literature review and future research agenda. Management Decision, 63(5), 1120–1145. https://mdi.ac.in/research/applications-of-artificial-intelligence-for-optimizing-banking-and-financial-operations-a-systematic-literature-review-and-future-research-agenda

[9] Staegemann, L., Hossain, M., & Wang, F. (2025). A review on large language models and generative AI in banking. Proceedings of the International Conference on Information Systems and Technology, 23(2), 210–228. https://www.scitepress.org/Papers/2025/134726/134726.pdf

[10] Waliullah, M., Rahman, T., & Khan, S. (2025). Assessing the influence of cybersecurity threats and risks on the adoption and growth of digital banking: A systematic literature review. arXiv. https://arxiv.org/abs/2503.22710