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Application of AI in Banks - A Study

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Abstract: *Artificial Intelligence refers to computer systems that are designed to learn, solve problems, and make decisions in a way that feels like human thinking. Instead of waiting for step-by-step instructions, these systems analyses the information, recognises different patterns, and performs various tasks on their own. This study explores how AI impacts on routine banking operations and creates traditional methods of service delivery. It examines the extent to which AI reshapes the formal banking activities and identifies the improvements after its application. The discussion covers the practical benefits as well as the challenges that come with relying on digital systems. In recent years, AI has played a key role in expanding services such as mobile banking, online banking, and technology-based communication channels, allowing banks to reach customers faster and more efficiently.*

Keywords: *Artificial Intelligence, Banking Sector, Risk Management, Customer Service*

I. INTRODUCTION

Artificial Intelligence means teaching computers and machines to act and think in a smart way, like how humans do. It helps machines to understand , learn , recognize information, and make decisions without taking instructions every time. AI do not follow commands to improve itself and work better when needed. some AI technologies are machine learning, chatbots, speech recognition, and smart assistants. Therefore, AI allows machines to learn, understand, and respond like humans but faster, more accurately, and without getting tired. Banks have existed for many years and were following traditional practices . Over time, technology has transformed the banking system and introduced modern services that were not available earlier. But in the last five years, AI has brought an immense impact on the banking sector. Banks adopted AI to increase their efficiency, improve customer services, manage risk, providing and improving financial solutions. As a result, AI has helped banks in reducing operational risks, improving security, increasing productivity, and offering smoother services to its customers there by creating a positive workforce. With technologies like machine learning, blockchain, and data analytics, banks are upgrading their products and services. AI is also used in various ways like now fraud detection, improving service quality, understanding customer behaviour, analysing credit history, and supporting many banking operations.

II. RESEARCH METHODOLOGY

This study adopts a descriptive research design to examine the role of Artificial Intelligence (AI) in traditional banking practices. The research is based on secondary data collected from academic journals, research articles, institutional publications, and recognized online repositories. Databases such as MDPI, ScienceDirect, ResearchGate, SSRN, Springer, AIMS Press, IJARSCT, and other open-access platforms were reviewed to extract relevant information. The nature of the data is qualitative and theoretical, focusing on conceptual interpretation rather than statistical testing.

III. LITERATURE REVIEW

Mixed-methods study on AI in risk management and fraud detection (2025): A sequential explanatory mixed-methods analysis of AI in banking revealed that sophisticated algorithms, including XGBoost and neural networks, markedly enhance real-time fraud identification and credit evaluations in various organizations. That said, it identifies obstacles like high implementation expenses, workforce skill deficiencies, and challenges in merging with outdated systems that hinder widespread adoption of these innovations.

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Yaseen (2025) – Adoption of AI-driven fraud detection: Yaseen's research into AI-based fraud detection within financial services indicates that banks implementing these tools achieve quicker spotting of anomalous transactions and lower losses from financial crimes. The analysis further emphasizes that employee buy-in, views on utility, and institutional backing are vital, while cautioning that inadequate change management might result in opposition and suboptimal use of AI technologies.

ML for credit scoring and loan default prediction (2025): A fresh investigation into ML-driven default forecasting utilizing behavioral and transactional data concludes that incorporating spending habits, account behaviors, and digital footprints substantially elevates prediction reliability. The researchers highlight that although banks benefit from enhanced risk oversight and improved portfolio standards, they need to tackle issues like client permissions, decision interpretability, and oversight from regulators on opaque "black box" systems.

Gambacorta et al. (2024) – Non-traditional data for credit risk: Drawing on fintech datasets, Gambacorta and collaborators demonstrate that ML algorithms incorporating unconventional data (e.g., transaction records and platform interactions) surpass traditional default prediction models during stable periods and economic downturns alike. Their work illustrates advantages in risk segmentation and promoting financial inclusion, yet it alerts potential systemic vulnerabilities if numerous entities rely on identical external data sources and algorithms.

Chang et al. (2024) – Credit risk prediction and regulatory concerns: Chang and team advocate for a structure to embed ML in credit scoring that aligns with regulatory standards. Their findings indicate that AI enhances risk categorization and allows banks to adjust credit strategies dynamically, but they stress the necessity of model verification, durability assessments, and clear rationales to meet oversight requirements and foster client confidence.

Aims Press credit-scoring comparison (2024): An evaluative analysis of six credit-scoring approaches (LDA, logistic regression, decision trees, random forests, SVM, and deep neural networks) in banking settings reveals that ensemble methods and deep-learning techniques deliver the highest forecasting precision. The writers advise, however, that more straightforward models might be more suitable in scenarios demanding high interpretability, particularly under stringent regulatory conditions for lending.

Polireddi et al. (2024) – AI and ML in financial fraud and services: Polireddi and associates explore how AI and ML are revolutionizing financial services through automation of fraud identification, risk evaluation, and credit processing. Their review points to notable increases in operational efficiency and expense savings, while also observing that over-reliance on such automated processes could expose institutions to threats from cyber incidents, data violations, or algorithmic breakdowns.

Leo et al. (2019) – Machine learning in banking risk management: Leo's seminal article posits that machine learning has the potential to overhaul virtually all facets of banking operations, ranging from customer preference insights to risk oversight and compliance monitoring. The contributors assert, though, that data integrity, fitting model choices, and institutional preparedness are essential for effective outcomes, and they caution that flawed execution could weaken rather than bolster risk mitigation efforts.

Bhatia (2017) – Early application of ML in credit scoring: Bhatia's exploration of credit scoring via data-mining methods demonstrates how demographic details and past payment records can more effectively sort borrowers into favorable and unfavorable risk categories than traditional manual processes. Even though this research precedes modern deep-learning techniques, it highlights a persistent drawback: credit models risk obsolescence unless banks routinely refresh them with up-to-date data.

Oyeniyi (2024) – Implementing AI in banking customer service: Oyeniyi's overview of AI applications in banking customer support indicates that tools like chatbots, virtual aides, and smart query routing shorten response times and handle standard inquiries automatically, thus improving the sense of service excellence. Still, the review observes that clients continue to prefer human engagement for intricate or sensitive matters, underscoring that AI ought to augment rather than supplant human representatives.

Graham (2025) – Chatbots in banking and finance: Graham's qualitative examination of banking and finance experts concludes that AI chatbots are gaining traction as effective instruments for streamlining customer support, providing nonstop access and uniform replies. Respondents also point out drawbacks, including shallow dialogue capabilities, struggles with atypical requests, and potential irritation from delays in transferring to live agents.

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Study of customer satisfaction with banking chatbots (2025): A survey-driven inquiry into chatbot performance and system attributes in banking discloses that factors like dependability, quick replies, and user-friendliness strongly affect satisfaction levels and trust perceptions. The inquiry further reveals that subpar issue handling and formulaic responses can tarnish the institution's image, implying that deficient AI designs might impair customer bonds instead of strengthening them.

Customer perception of AI in public banking institutions (2025): An empirical analysis centered on public sector banks indicates that patrons typically view AI positively when it appears straightforward and helpful for streamlining dealings. Conversely, the analysis identifies apprehensions over employment reductions, diminished personal engagement, and data vulnerabilities, which could impede uptake unless banks effectively convey advantages and protective measures.

Chatbot service quality in banking (2024): An investigation into chatbot quality in Indian banking contexts suggests that elements such as promptness, designed-in empathy, and sensed security influence users' holistic judgments of AI-assisted help. The work cautions that viewing chatbots solely as expense reducers, without prioritizing user-centric design, could yield reduced contentment and diminished allegiance relative to human-led interactions.

Bhattacharya & Sinha AI and customer experience in banking (2022): Bhattacharya and Sinha assess the ways AI features like suggestion systems, tailored notifications, and smart self-help options eliminate banking experiences by rendering services more pertinent and accessible. They likewise warn that too much automation risks distancing those who cherish interpersonal connections, and that moral handling of client information is key to preserving credibility.

Gyau et al AI technology and financial performance (2024): Gyau and partners connect AI technological advancements in banking to superior financial results, evidencing that AI-investing banks often secure higher returns and streamlined operations. Their examination, however, observes that oversight limitations, funding demands, and varying tech preparedness can temper these gains, positioning AI as just one element in shaping institutional performance.

Integration of AI in banking trust and ethics (2024): Integrating AI into everyday banking goes beyond the technical aspects. It sheds light on a critical human element. True adoption depends much on ethics, trust, and company culture as it does on technology itself. The findings show that success requires addressing staff concerns like employee compatibility with AI, fear of losing jobs, and the need for transparency thereby creating healthy workforce environment.

Fraud detection in banking using AI (2024): A targeted piece on AI-enabled fraud detection platforms reveals that ML and pattern-identification techs greatly advance instantaneous surveillance and alerting irregular behaviors, curbing damages from payment and web-based scams. The piece adds, however, that erroneous alerts may burden valid users, and that fraudsters' adaptations necessitate ongoing model refinements by banks.

AI in fraud detection and financial risk mitigation (2024): A wider-ranging discussion on fraud spotting and risk reduction in banking, insurance, and fintech illustrates how AI enables a move from responsive to proactive strategies via insights from vast transaction datasets. The writers emphasize, nonetheless, that consolidating AI infrastructures or leaning on third-party suppliers could foster aggregation risks and spark debates on data control.

Robo-advisors and digital wealth services (2022–2025): Research on robot-advisors highlights that digital investment services provide reduced costs and broader entry to asset management, appealing especially to young and broad-market users. Simultaneously, studies identify uptake challenges like skepticism toward pure automation, inclination toward blended human-AI setups, and hurdles in scaling robot services profitably, prompting some major banks to revise or discontinue them.

Regulatory and stability concerns over AI in banking (2024–2025): Current regulatory insights from the Reserve Bank of India caution that broad AI and ML deployment in finance might spawn fresh stability threats, such as reliance on limited tech suppliers and inscrutable, audit-resistant models. Cases like erratic banking chatbots further exemplify reputation hazards, demonstrating that laxly overseen AI in public roles can erode brand esteem and patron assurance.

IV. OBJECTIVES

On careful examination of above literature, the following objectives are framed:

- To examine how Artificial Intelligence is being used in everyday banking operations.

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- To identify the benefits of AI in improving service quality, security, and operational efficiency in banks.
- To highlight the challenges and limitations banks face while adopting AI-based systems.
- To understand how AI is influencing the future direction of banking services and customer experience.

V. ARTIFICIAL INTELLIGENCE IN BANKING

Artificial intelligence (AI) is transforming the banking industry by enhancing efficiency, security, and customer experience across front, middle, and back-office operations. Banks are leveraging various AI technologies, from traditional machine learning to cutting-edge generative AI, to automate processes, manage risks, and offer personalized services.

The Following Are Banking Practices Where AI Is Applied.

- **Customer Service**: AI-powered chatbots and virtual assistants provide 24/7 support for routine inquiries, such as checking balances, transferring funds, or applying for loans, reducing waiting times and freeing human agents for more complex issues.
- **Fraud Detection and Prevention**: Banks use AI algorithms to analyze vast amounts of transaction data in real-time and identify unusual patterns or anomalies indicative of fraud or identity theft. These systems continuously learn from new data, adapting to evolving criminal tactics more effectively than traditional rule-based systems.
- **Credit Scoring and Loan Underwriting**: AI-driven models assess creditworthiness more accurately and quickly by analyzing a broader range of data, including non-traditional information like utility payments or e-commerce activity. This accelerates loan approval (e.g., reducing approval times from day to minute) and promotes financial inclusion.
- **Risk Management and Compliance**: AI helps manage complex regulatory requirements (e.g., Know Your Customer (KYC) and Anti-Money Laundering (AML) regulations) by automating monitoring, identifying potential non-compliance issues, and generating reports. Predictive analytics also helps banks assess and mitigate market and credit risks.
- **Personalized Banking and Wealth Management**: AI analyzes customer behavior and financial goals to provide tailored product recommendations, personalized financial advice, and customized investment portfolios through robot-advisors.
- **Operational Efficiency and Automation**: Robotic Process Automation (RPA) and AI automate repetitive back-office tasks like document verification, data entry, and reconciliation, minimizing human error and reducing operational costs..

VI. BENEFITS OF AI IN BANKING

The major benefits include:

1. Faster and Smarter Customer Service

AI-powered service systems handle routine questions such as balance updates, transaction history, or password issues within seconds. This reduces crowding at bank counters and lowers the pressure on staff. The technology functions consistently even during high-traffic hours, providing customers with timely support without depending on branch timings.

2. Stronger Fraud Prevention and Real-Time Security

AI tools examine transactions continuously and pick up unusual behaviour—like sudden high withdrawals or login attempts from unfamiliar devices. This early detection prevents scams from growing into bigger losses. Security becomes more proactive instead of reacting after fraud has already occurred.

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3. Fair and Data-Based Loan Approvals

AI evaluates loan applications using repayment behaviour, account patterns, and financial stability rather than only relying on human judgement. This reduces personal bias, makes decisions more consistent, and speeds up the approval process for eligible customers. It also lowers the chances of risky lending.

4. Improved Financial Risk Monitoring

AI scans market signals, customer profiles, and operational records to identify possible risks before they cause damage. Banks can take preventive actions like reviewing accounts, adjusting policies, or intervening with customers early. This is helpful in avoiding future losses and improving financial stability.

5. Reduced Cost of Operation

Automation eliminates repeated paperwork, verification steps, and manual data checks. This reduces labour cost, processing time, and physical document handling. Over time, banks save money while still improving service output and quality.

6. Available Anytime, Anywhere (24/7 Banking)

AI services remain active even when human staff are not available. Customers can solve basic issues at night, during holidays, or from remote locations. This accessibility is especially useful for people who work long hours or cannot visit branches frequently.

7. Personalised Services for Every Customer

AI studies customer behaviour to understand what they need. It recommends suitable services like saving plans, credit upgrades, or investment advice that match the customer's situation. This makes banking more personal and relationship-focused rather than generic and repetitive.

8. Faster and Cleaner Data Management

AI handles huge volumes of financial records without confusion, providing organised insights for decision-making. It reduces human errors, improves accuracy, and helps banks plan policies or strategies with clearer evidence.

9. Support for Digital and Remote Banking

AI enables online account opening, e-KYC verification, remote document uploads, and app-based services. This reduces physical branch dependency and brings banking services to rural areas, busy users, and customers who cannot visit banks often.

10. Smoother Internal Workflow and Higher Productivity

Tasks like document screening, identity checks, and complaint routing are completed quickly with AI tools. Employees can then focus on customer relationships and problem-solving instead of routine desk work, increasing productivity inside the bank.

VII. LIMITATIONS OF AI IN BANKING

Following are the limitations of AI in Banking practices:

1. High Setup and Technology Cost

Banks need strong digital infrastructure, licensed software, secure networks, and trained staff to operate AI systems. These investments are expensive, and not every bank especially small one can afford complete automation immediately.

2. Sensitive Data and Privacy Risks

AI requires access to personal details such as identity proof, financial history, or credit information. If the system is not protected properly, data could be misused or leaked. Customers may hesitate to trust AI if they feel their information is not safe.

3. Skill Gap Among Employees

Many staff members are not familiar with AI-based tools, leading to confusion and mistakes during usage. Without proper training programs, employees may feel technology is replacing them instead of supporting their work, which creates resistance.

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4. Overdependence on Automated Systems

If banks rely too much on AI, even a small technical failure or system error can pause services. In situations like server crashes or wrong output, employees must be capable of taking manual control, but this doesn't happen if dependency becomes too high.

5. Lack of Human Connection in Customer Interaction

AI cannot sense emotional needs or personal struggles in financial situations. During complaints, loan disputes, or repayment issues, customers prefer speaking with a human who can understand their situation. AI can support the process, but it cannot fully replace human empathy.

VIII. AI SHAPING THE FUTURE OF THE BANKS

Based on the AI technologies improvement, benefits and limitations Artificial Intelligence is expected to play a central role in the future of banking by changing how services are delivered, decisions are made, and customers interact with financial institutions. Instead of depending only on physical branches, banks are moving towards digital platforms where AI handles routine tasks such as customer inquiries, account verification, loan screening, and fraud alerts. Services that once required human involvement are gradually becoming automated, allowing customers to access banking support at any time through chatbots, virtual assistants, and mobile apps. AI also helps banks study customer behaviour, predict needs, and offer personalised solutions like tailored loan offers or investment recommendations. On the operational side, AI systems strengthen security through real-time fraud detection, biometric authentication, and early risk warnings, making banking more secure than traditional manual checks. As a result, the future of banking is expected to follow a hybrid model: AI will manage repetitive and data-based tasks, while human staff will focus on problem-solving, relationship building, and complex financial decisions. This shift indicates that banks will become more digital, faster, safer, and customer-centric in the coming years.

IX. CONCLUSION

This study concludes that Artificial Intelligence is playing an increasingly important role in modern banking by improving customer service, faster processing, fraud prevention, and decision-making accuracy. AI has helped banks deliver services more efficiently through tools like chatbots, automated verification, mobile banking, and data-based lending systems. However, banks still face challenges such as data privacy concerns, cyber risks, high implementation costs, and the need for skilled staff to manage new technologies. AI cannot replace human roles entirely, but it acts as strong support to banking employees and systems. Overall, AI is transforming the banking sector gradually, making it more digital, secure, customer-friendly, and performance-oriented. With proper training, safety measures, and responsible usage, AI will continue to benefit the banking industry in the coming years**.**

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