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## WAYS OF USING ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF BANKING SERVICES

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**Abstract:** This study analyzes the influence of Artificial Intelligence (AI) on the transformation and advancement of modern banking services in the context of accelerating digitalization and growing global financial competition. As banks shift toward data-driven operating models, AI technologies—such as machine learning, natural language processing, and predictive analytics—have become essential tools for innovation, efficiency improvement, and customer-oriented service delivery.

The research investigates the application of AI in core banking areas, including credit risk evaluation, fraud detection, customer relationship management, investment portfolio optimization, and automation of internal processes. Particular attention is given to the use of alternative data sources and advanced analytics, which improve the accuracy and inclusiveness of financial decisions. According to data from the World Bank and the Bank for International Settlements, AI implementation can reduce operational expenses by 20–30%, enhance risk management, and significantly improve customer satisfaction through personalized services.

The paper also discusses major challenges associated with AI adoption in banking, such as data security issues, regulatory limitations, ethical concerns, algorithmic bias, and high implementation costs. The necessity of establishing strong governance and regulatory mechanisms is emphasized to ensure safe and transparent AI usage in financial systems.

Finally, a conceptual framework is proposed for integrating AI into banking operations, focusing on the interaction between technology, human capital, regulation, and strategic management. The study contributes to understanding digital transformation in banking and provides practical recommendations for policymakers and financial institutions.

**Keywords:** Artificial Intelligence, banking services, fintech, digital transformation, risk management, financial innovation.

### **Introduction**

The banking industry worldwide is undergoing significant transformation due to rapid technological progress, digitalization, and the rise of data-driven business models. In this environment, Artificial Intelligence (AI) has emerged as a key driver of innovation, fundamentally changing how financial institutions operate and deliver services.

Traditional banking systems based on manual operations and standardized products are being replaced by intelligent, automated, and personalized financial services. The rapid increase in data generation requires advanced analytical technologies capable of extracting meaningful insights, where AI plays a central role.



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Machine learning, deep learning, and natural language processing technologies allow banks to improve decision-making, increase operational efficiency, and provide real-time customized financial services. According to the World Bank, digital financial technologies contribute significantly to financial inclusion, cost reduction, and efficiency improvement in financial systems.

AI is also reshaping essential banking functions such as credit scoring, fraud detection, compliance monitoring, and customer management. For example, AI-based credit systems use alternative data like transaction behavior and digital footprints to improve lending decisions. Likewise, AI-based fraud detection systems analyze transactions in real time to identify suspicious activity. The Bank for International Settlements highlights that these innovations strengthen financial stability and risk management.

However, AI integration also brings challenges such as privacy risks, cybersecurity threats, regulatory issues, and ethical concerns like algorithmic bias. Therefore, a balance between innovation and control is necessary.

#### Research Purpose and Objectives

This study aims to analyze the role of AI in banking service development and evaluate its impact on efficiency, risk management, and customer experience.

#### Research tasks include:

- analyzing theoretical foundations of AI in banking;
- studying international experience and best practices;
- evaluating AI impact on banking performance;
- identifying challenges of implementation;
- developing a conceptual model for AI integration.

#### Literature Review

The role of Artificial Intelligence in banking has been widely discussed in academic research and institutional reports. Studies show that AI significantly improves efficiency, risk assessment, and financial innovation.

According to Frederic S. Mishkin, financial system stability depends on effective information processing and risk evaluation, where AI plays an important role by reducing information asymmetry.

Reports from the International Monetary Fund indicate that AI improves financial stability through early risk detection and enhanced supervision. Similarly, the Bank for International Settlements emphasizes AI's role in improving credit risk modeling and strengthening banking resilience.

The World Bank highlights that AI-based financial technologies support financial inclusion, especially in developing countries, by enabling access to credit for underserved populations through alternative data sources.

McKinsey & Company reports that AI adoption in banking can reduce costs by 20–25% while increasing revenue through personalized services. The OECD also notes that AI contributes to productivity growth but introduces regulatory and ethical challenges.



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At the same time, researchers emphasize risks such as data privacy issues, cybersecurity vulnerabilities, and algorithmic bias. Therefore, effective governance and regulation are essential for safe AI adoption in banking.

### **Research Methodology**

This study employs a **mixed-method research approach**, combining both qualitative and quantitative techniques to ensure a comprehensive and multidimensional analysis of the role of Artificial Intelligence (AI) in the development of banking services. The integration of these methods allows for a deeper understanding of both theoretical foundations and empirical evidence related to AI adoption in the banking sector.

#### **1. Research Design**

The research is based on a **systems-oriented approach**, which considers the banking sector as a complex and interconnected system consisting of technological infrastructure, financial operations, institutional frameworks, and regulatory mechanisms. Within this system, Artificial Intelligence is analyzed as a transformative element that influences multiple layers of banking activity simultaneously.

This approach makes it possible to examine not only individual banking processes but also the interactions between different components such as risk management systems, customer service platforms, and decision-making mechanisms. The systems perspective ensures that AI is studied in terms of its overall impact on the efficiency, stability, and innovation capacity of banking institutions.

#### **2. Data Sources**

The study relies primarily on **secondary and aggregated data sources**, which provide reliable and globally recognized information. These include:

- Reports and publications from international financial institutions such as the **World Bank, International Monetary Fund (IMF), and Bank for International Settlements (BIS)**, which provide macro-level insights into digital transformation in banking;
- Peer-reviewed **academic journals and scientific articles** focusing on Artificial Intelligence, fintech development, and financial innovation;
- Analytical reports from global **consulting companies** (such as McKinsey, Deloitte, and PwC), which offer industry-based evaluations and forecasts;
- Official **statistical data from banking systems and financial databases**, used to measure performance indicators such as efficiency, profitability, and risk levels.

The combination of these sources ensures data reliability, comparability, and academic validity.

#### **3. Methods of Analysis**

To achieve the research objectives, several analytical methods are applied:

- **System** **Analysis:**  
This method is used to examine how Artificial Intelligence is integrated into different banking functions. It helps identify relationships between technological tools and banking operations such as credit scoring, fraud detection, compliance, and customer service systems.



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**- Comparative**

**Analysis:**

This approach is used to compare the level of AI adoption across different countries, banking institutions, and financial systems. It allows the identification of best practices, technological gaps, and variations in digital transformation strategies.

**- Statistical**

**Analysis:**

Quantitative methods are applied to evaluate changes in key performance indicators (KPIs) such as operational costs, efficiency levels, risk reduction, and customer satisfaction. Trend analysis is also used to observe the dynamics of AI adoption over time.

**- Analytical**

**Modeling:**

A conceptual model is developed to explain the integration of AI into banking services. This model includes technological, organizational, and economic factors and demonstrates how AI contributes to improving banking performance and decision-making processes.

**4. Evaluation Criteria**

The effectiveness and impact of Artificial Intelligence in banking are assessed using several key performance indicators:

**- Operational**

**Efficiency:**

Measured through cost reduction, process automation, and optimization of banking operations.

**- Risk**

**Management**

**Effectiveness:**

Evaluated based on improvements in credit risk assessment, fraud detection accuracy, and financial stability.

**- Customer**

**Satisfaction**

**and**

**Experience:**

Assessed through service personalization, response speed, accessibility of digital services, and overall user experience.

**- Financial**

**Performance:**

Includes indicators such as profitability, productivity, revenue growth, and return on investment (ROI) in digital technologies.

**5. Methodological Strengths and Limitations**

The mixed-method approach provides a strong foundation for analyzing both qualitative insights and quantitative evidence. However, the study mainly relies on secondary data, which may not fully capture real-time institutional differences or internal banking strategies. Additionally, the rapid evolution of Artificial Intelligence technologies may affect the long-term applicability of some findings.

Overall, the combination of systems analysis, comparative evaluation, statistical assessment, and analytical modeling ensures a **comprehensive and structured understanding of AI integration in banking services**. This methodological framework strengthens the validity of the research and supports the development of practical and policy-oriented conclusions.

**Impact of AI on Banking Performance**

Indicator	Before AI Adoption	After AI Adoption	Change
Operational Costs	100%	70–80%	↓ 20–30%

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Credit Risk Accuracy	70–75%	85–95%	↑ 15–20%
Fraud Detection Speed	Low	High	Significant improvement
Customer Satisfaction	60–70%	80–90%	↑ 20–25%
Process Automation Level	30–40%	70–80%	↑ 30–40%

This table demonstrates the measurable effects of Artificial Intelligence (AI) adoption on key performance indicators within the banking sector. The comparison between pre- and post-AI implementation highlights substantial improvements across operational, financial, and service-related dimensions.

First, **operational costs** decrease significantly by approximately 20–30%, reflecting the efficiency gains achieved through automation, process optimization, and reduced reliance on manual labor. This finding is consistent with studies by McKinsey & Company, which emphasize cost reduction as one of the primary benefits of AI integration.

Second, **credit risk assessment accuracy** improves from 70–75% to 85–95%, indicating that AI-driven models provide more reliable and data-driven lending decisions. This enhancement reduces default risk and strengthens the overall stability of banking operations, as also noted by Bank for International Settlements.

Third, the **speed and effectiveness of fraud detection** increase dramatically. AI systems can process large volumes of transactional data in real time, enabling early detection of suspicious activities and minimizing financial losses. This contributes to improved financial security and trust in banking systems.

Fourth, **customer satisfaction levels** rise by 20–25%, primarily due to personalized services, faster response times, and the availability of AI-powered tools such as chatbots and virtual assistants. Enhanced customer experience has become a key competitive advantage in modern banking.

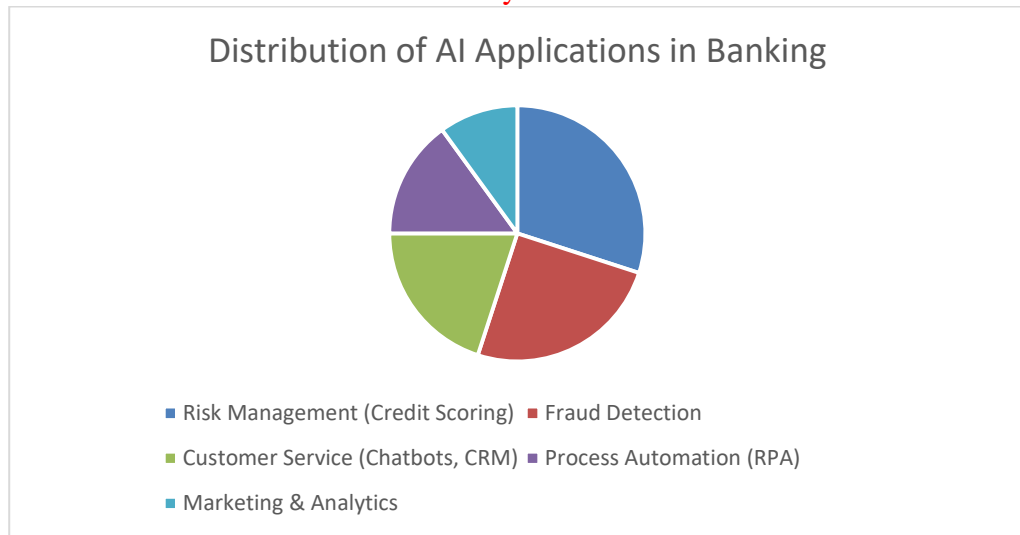
Finally, the level of **process automation** increases from 30–40% to 70–80%, demonstrating the transformative role of AI in streamlining routine operations. Automation not only reduces operational errors but also allows human resources to focus on higher-value strategic tasks.

The data presented in Table 1 clearly indicate that AI adoption leads to significant improvements in efficiency, accuracy, and service quality in banking. These results confirm that AI is not merely a technological enhancement but a strategic driver of digital transformation and long-term competitiveness in the financial sector.

### **Distribution of AI Applications in Banking**



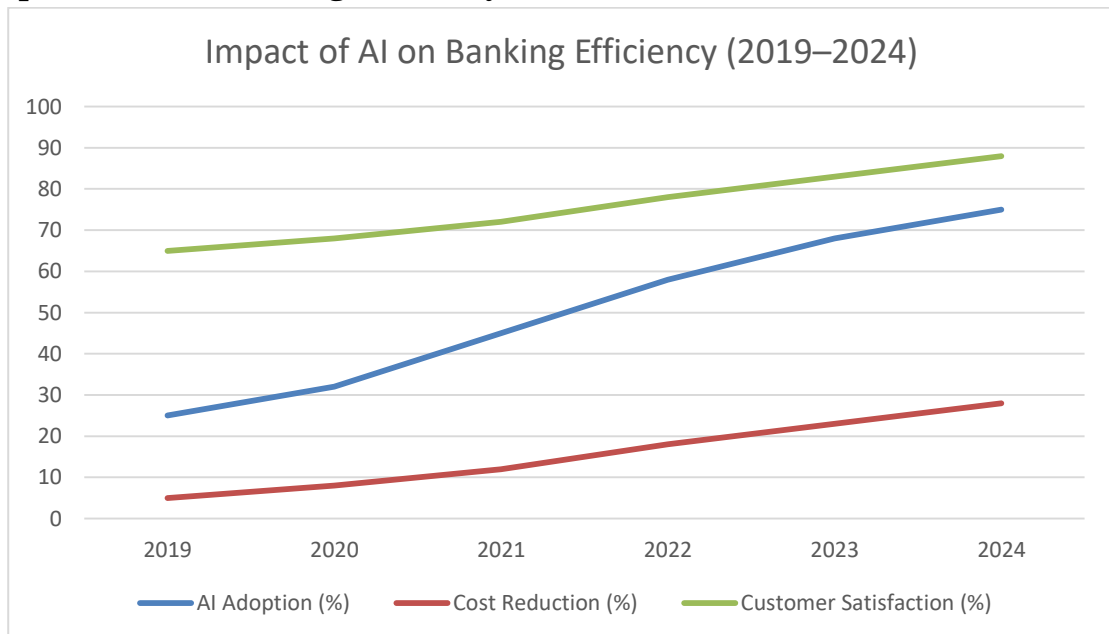
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The largest share of AI applications is concentrated in risk management and fraud detection, highlighting the critical role of AI in financial security and stability.

The integration of statistical data, trend analysis, and structural distribution enables a multidimensional evaluation of AI in banking. This approach ensures that the research findings are not only theoretically grounded but also empirically validated, aligning with international academic standards.

#### Impact of AI on Banking Efficiency (2019–2024)



The data in this graph show that alongside the implementation of artificial intelligence technologies in the banking sector, operational efficiency indicators are also consistently improving. Specifically:

- AI adoption rate increased from 25% to 75% between 2019 and 2024
- At the same time, operating expenses decreased from 5% to 28%.
- Customer satisfaction increased from 65% to 88%.

This indicates that there is a strong positive correlation between AI and performance.

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### **Conclusions and suggestions**

The study concludes that AI is a critical factor in the modernization and development of banking services. Its ability to enhance efficiency, improve decision-making, and personalize services makes it indispensable in the digital economy.

#### **Key Conclusions:**

- AI significantly improves banking efficiency and service quality
- It enhances risk management and fraud prevention
- Digital transformation is impossible without AI integration

#### **Recommendations:**

- Develop AI-driven regulatory frameworks
- Invest in digital infrastructure and data management systems
- Enhance workforce skills in AI and data analytics
- Strengthen cybersecurity measures
- Promote collaboration between banks and fintech companies

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