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THE ROLE OF ARTIFICIAL INTELLIGENCE IN MODERN BANKING SYSTEMS

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Abstract

Artificial intelligence (AI) is rapidly transforming the banking sector by improving efficiency, decision-making, and customer service. It is applied in fraud detection, credit assessment, risk management, compliance monitoring, and portfolio analysis. At the same time, the adoption of AI creates new challenges related to explainability, data quality, privacy, bias, and operational resilience. This article examines the main applications of AI in banking, summarizes its key benefits, and discusses the risks that financial institutions must manage to ensure safe and effective implementation. The study concludes that the most sustainable model is not replacing humans with AI, but combining AI capabilities with human supervision and accountability.

Keywords

artificial intelligence, banking, fraud detection, credit scoring, risk management, generative AI, financial supervision.

Introduction

Digital transformation has changed the way banks operate, and AI is now at the center of this change. Financial institutions work with large volumes of data, fast transactions, and high customer expectations, so they need tools that can process information quickly and support better decisions. The OECD notes that AI is increasingly used in financial markets and that generative AI is transforming banking by improving the speed and quality of text, code, and analytical outputs. The IMF also emphasizes that AI can bring productivity gains, cost savings, improved compliance, and more tailored offers to clients.

Methodology

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This study is based on qualitative analysis of international reports, academic publications, and policy documents related to artificial intelligence in the banking sector. The article mainly relies on materials published by the OECD, IMF, EBA, and BIS between 2024 and 2025. Comparative and analytical approaches were used to evaluate the benefits, risks, and future trends of AI implementation in banking.

Main applications of AI in banking

One of the most important uses of AI is fraud detection and anti-money laundering work. AI systems can analyze unusual transaction patterns, customer behavior, and large sets of unstructured data faster than traditional manual methods. According to the IMF, AI and related technologies are already used extensively in fraud detection and AML/CFT compliance, where they can help reduce false positives and allow staff to focus on truly suspicious cases. In practice, this makes monitoring more efficient and improves the quality of risk control.

Table 1. Main Applications of AI in Banking

Area	AI Function	Example Use
Security	Fraud detection	Anomaly detection in transactions
Customer service	Chatbots	24/7 customer support
Credit system	Risk analysis	Loan scoring and borrower profiling
Compliance	AML/CFT monitoring	Suspicious transaction detection
Operations	Process automation	Document processing and internal support

Many international banks already use AI technologies in daily operations. For example, JPMorgan Chase applies AI systems for fraud detection and legal document analysis, while Bank of America uses its virtual assistant “Erica” to provide automated customer support and financial recommendations. These examples show that AI technologies are becoming an essential part of modern banking infrastructure.

AI is also widely used in credit analysis and customer segmentation. Banks use machine learning models to evaluate borrower behavior, payment history, spending patterns, and other financial indicators. The OECD states that AI is used in credit decisions, risk management, customer service, compliance, and portfolio management. In the banking context, this means faster loan assessment, more personalized offers, and better identification of both low-risk and high-risk clients.

Customer service is another major area of application. EBA research shows that the most common current use cases for generative AI in EU banks are customer support and internal process optimization. Banks use chatbots, call-center transcription, call summarization, and automated assistance for employees. The same source also notes that banks are testing AI for legal analysis, coding support, and internal policy interpretation, which shows that AI is moving beyond customer-facing tools into core operational work.

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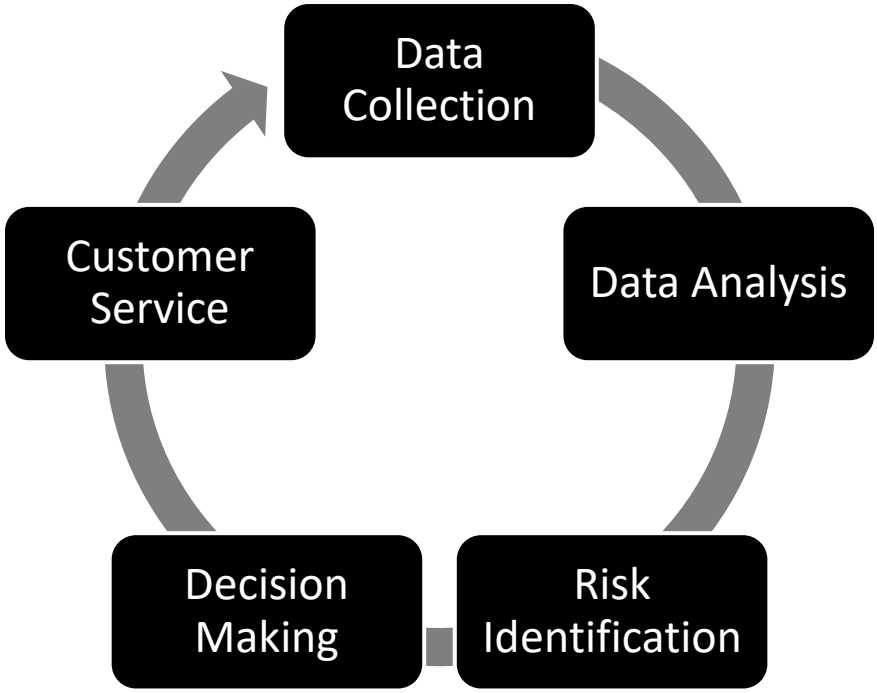

Figure 1. Workflow of AI in Banking

Benefits and risks

According to recent international reports, the global AI in banking market is expected to grow significantly over the next decade due to increasing demand for automation, fraud prevention, and personalized financial services. Large financial institutions are investing heavily in machine learning technologies to improve operational efficiency and customer satisfaction. This trend demonstrates that AI is no longer an experimental technology, but a strategic necessity for modern banking systems.

The main benefit of AI in banking is efficiency. It can speed up routine tasks, reduce operational costs, improve accuracy, and support better customer experience. It also helps banks offer faster and more personalized services. At the same time, the BIS warns that without proper controls and oversight, AI can amplify financial vulnerabilities. The most important concerns include wider integration of AI into core operations, dependence on specialized infrastructure providers, and the use of opaque training data, all of which may complicate model validation and resilience.

A second group of risks concerns explainability, reliability, and consumer protection.

The EBA highlights that generative AI may be difficult to explain, may produce hallucinated or misleading outputs, and can create transparency problems in consumer-facing services. It also warns about bias, discrimination, privacy

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concerns, and the need for human-in-the-loop supervision. This means that banks cannot treat AI as a fully autonomous decision-maker; human review remains essential, especially in lending, compliance, and customer advice.

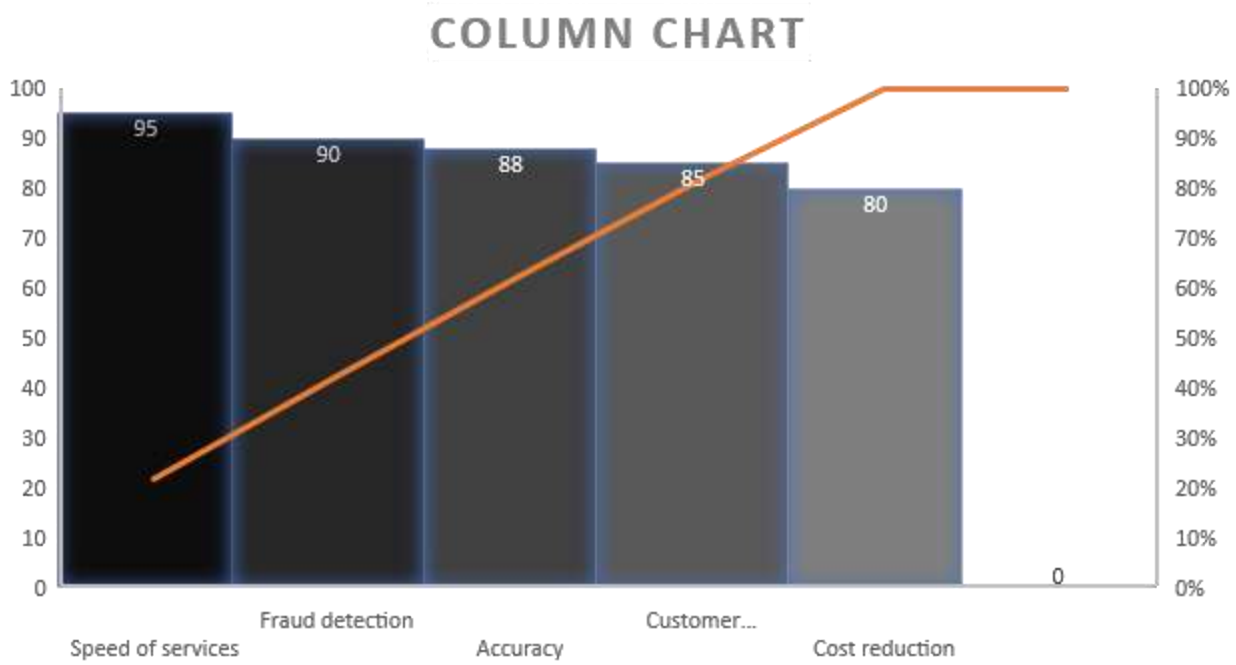

Figure 2. Key Benefits of AI in Banking

Discussion

For AI to work well in banking, implementation should be gradual and risk-based. Banks need strong data governance, model testing, security controls, staff training, and clear accountability. The OECD recommends a step-by-step, risk-aligned approach supported by quality data, sound governance, privacy protection, and ethics. In my view, the best banking model is not "AI instead of humans," but "AI with humans." AI should handle repetitive and data-heavy tasks, while people remain responsible for judgment, ethics, and final decisions. This combination gives banks speed without losing trust.

In my opinion, artificial intelligence should support banking employees rather than replace them completely. Human supervision remains necessary in financial decision-making because ethical and strategic judgments still require human responsibility.

Future Trends

In the future, AI in banking is expected to become more advanced through the integration of generative AI, predictive analytics, and biometric technologies. Banks may increasingly rely on AI for personalized financial planning, cybersecurity, and automated investment management. However, future development will also require stronger regulation, ethical standards, and international cooperation to ensure transparency and consumer protection.

Conclusion

Artificial intelligence is changing banking from a traditional service industry into a more data-driven, predictive, and customer-oriented system. Its strongest advantages are speed, efficiency, personalization, and stronger risk monitoring. However, these benefits are sustainable only if banks manage explainability, data quality, security, and consumer protection carefully. The future of banking will likely belong to institutions that use AI wisely, supervise it responsibly, and keep human judgment at the center of important decisions.

In the long term, banks that successfully combine technological innovation with ethical responsibility will achieve stronger customer trust, higher operational efficiency, and more sustainable financial growth.

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