



Original Article

Artificial Intelligence in Finance

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Abstract

Artificial Intelligence experience a rapid development and is being used in a wide range of sectors and activities, including finance over the past two decades. The motive of this research is to provide comprehensive overview of the existing research. The primary objective is to dissect the varied applications of Artificial Intelligence within finance. In addition, the research looks towards future assessing Artificial Intelligence prospective development in the financial industry. The Theory Context Characteristics Methodology (TCCM) framework guides the analysis, focusing on thematic mapping to explore key points. The paper further discusses the challenges associated with AI adoption, including ethical concerns, data privacy issues, model transparency and regulatory constraints. Finally, the study provides insights into the future direction of AI in finance, emphasizing the need for responsible innovation, robust governance mechanisms and collaboration between technological and financial stakeholders. Overall, this research contributes a comprehensive and original perspective on the strategic role of Artificial Intelligence in shaping the future of financial systems.

Key Points: Artificial Intelligence, Finance, Algorithm trading, Fintech, Machine learning, Customer service

Introduction

Artificial Intelligence (AI) has emerged as one of the most influence technological developments of the modern era, fundamentally altering hkw organizations process information and make decisions. In the financial sector, where accuracy, speed and risk assessment are critical, AI has gained exceptional importance. Financial Institutions operate I. Highly dynamic environments that generate massive volumes of data daily, and traditional analytical methods are often insufficient to manage such complexity. AI – based systems address this limitations by enabling automated learning, pattern recognition and predictive decision-making, thereby transforming the overall structure of financial operations. The integration of AI into finance has led to the development of advanced systems capable of performing tasks that previously required extensive human involvement. These include intelligent credit evaluation, fraud identification, portfolio optimization, automated trading strategies, and personalized customer interaction. Through machine learning algorithms and data-driven models, financial organizations can analyze historical and real-time data to identify trends, assess risks, and improve forecasting accuracy. As a result, AI not only enhances operational efficiency but also supports more informed and consistent decision-making processes.

From an academic and technological perspective, the evolution of artificial intelligence can be traced back to the mid-twentieth century, when early researchers began exploring the possibility of creating machines that could replicate elements of human reasoning. Initial progress was constrained by limited computational power and data availability. However, advancements in computing infrastructure, cloud technology, and data storage have significantly accelerated AI development in recent decades. This progress has enabled AI applications to move beyond theoretical experimentation and become practical tools within financial systems.

Since the beginning of the twenty-first century, scholarly interest in artificial intelligence within finance has expanded substantially. Research has increasingly focused on the application of AI techniques such as machine learning, data mining, and text analysis to solve financial problems related to prediction, detection, and optimization. These studies reflect a global trend, with contributions from both developed and emerging economies, indicating the widespread relevance of AI in modern finance.

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At the same time, the growing reliance on AI has raised important concerns related to transparency, ethical responsibility, and regulatory compliance, highlighting the need for balanced and well-governed implementation. This research paper aims to examine the role of artificial intelligence in finance by analysing its applications, advantages, and limitations within financial institutions. By synthesizing existing knowledge and identifying emerging themes, the study seeks to contribute a structured and original understanding of how AI is reshaping financial practices and influencing the future direction of the financial industry.

Impacts Of Artificial Intelligence In Finance

Artificial intelligence has introduced a structural shift in the financial sector by redefining how financial information is processed, interpreted, and applied in decision-making. Rather than acting as a supporting tool, AI has become an integral component of modern financial systems, influencing strategic planning, operational execution, and customer engagement. The impact of AI in finance can be observed across multiple functional areas, as discussed below.

1. Algorithmic and High-Frequency Trading

AI-driven trading systems utilize advanced computational models to analyze vast volumes of financial data, including historical price movements, market indicators, news flows, and investor sentiment. These systems are capable of identifying trading patterns that are often invisible to human analysts. By continuously learning from market behavior, AI algorithms can adjust trading strategies in real time and execute transactions at extremely high speeds.

Impact:

- Enhances market efficiency through rapid execution of trades.
- Improves pricing accuracy by reducing delays in information processing.
- Limits the influence of emotional and subjective human judgment in trading decisions.

2. Risk Management and Predictive Analytics

Artificial intelligence significantly strengthens risk management frameworks by enabling financial institutions to anticipate potential threats rather than merely responding to them. AI models integrate data from diverse sources such as transaction histories, macroeconomic indicators, and behavioral trends to assess risk exposure. Predictive analytics allows institutions to simulate future scenarios and evaluate the possible impact of adverse events.

Impact:

- Enables early identification of credit, market, and operational risks.
- Supports proactive risk mitigation strategies.
- Reduces financial instability during periods of economic uncertainty.

3. Fraud Detection and Financial Security

AI has transformed fraud detection by shifting from rule-based monitoring systems to intelligent behavioral analysis. Machine learning models can detect unusual transaction patterns, identify anomalies, and flag suspicious activities in real time. Unlike traditional systems, AI continuously improves its detection capability as new fraud techniques emerge.

Impact:

- Increases accuracy in identifying fraudulent transactions.
- Minimizes false alerts that burden operational teams.
- Enhances customer trust by improving transaction security.

4. Credit Assessment and Lending Decisions

AI-based credit evaluation systems assess borrower risk by analyzing a broader range of data beyond traditional financial records. These systems consider spending behavior, repayment patterns, and financial stability indicators to generate more precise credit profiles. As a result, lending decisions become faster and more data-driven.

Impact:

- Improves credit accessibility for underrepresented borrowers.
- Reduces default rates through improved borrower assessment.
- Enhances consistency and fairness in lending decisions.

5. Customer Experience and Personalization

Artificial intelligence enables financial institutions to deliver personalized services by analyzing customer preferences, transaction behavior, and communication patterns. Intelligent virtual assistants and recommendation systems provide real-time support and customized financial solutions, improving customer satisfaction.

Impact:

- Enhances customer engagement through tailored financial services.
- Reduces response time in customer service operations.
- Strengthens long-term customer relationships and retention.

6. **Regulatory Compliance and Reporting**

Compliance with evolving financial regulations is a complex and resource-intensive process. AI-driven compliance systems continuously monitor regulatory updates, evaluate internal practices, and generate accurate reports. These systems reduce manual errors and ensure timely adherence to regulatory requirements.

Impact:

- Lowers the risk of regulatory violations and penalties.
- Reduces compliance-related operational costs.
- Improves transparency and audit readiness.

7. **Operational Efficiency and Cost Optimization**

AI automates repetitive and time-consuming financial processes such as data reconciliation, transaction verification, and reporting. By reducing reliance on manual labor, institutions can allocate human resources to higher-value strategic activities.

Impact:

- Decreases operational costs through automation.
- Improves processing speed and accuracy.
- Enhances overall productivity within financial institutions.

8. **Strategic Decision-Making and Forecasting**

AI supports strategic financial planning by providing accurate forecasts based on complex data analysis. Decision-makers can use AI-generated insights to evaluate investment opportunities, allocate resources effectively, and adapt to changing market conditions.

Impact:

- Strengthens long-term financial planning.
- Improves accuracy of financial forecasts.
- Supports evidence-based strategic decisions.

9. **Ethical and Governance Implications**

While AI offers numerous benefits, its growing influence also raises ethical and governance challenges. Issues related to data privacy, algorithmic transparency, and accountability have become critical considerations for financial institutions adopting AI technologies.

Impact:

- Encourages development of responsible AI governance frameworks.
- Promotes ethical decision-making in automated financial systems.
- Highlights the importance of human oversight in AI-driven processes.

10. **Long-Term Transformation of the Financial Ecosystem**

The cumulative impact of artificial intelligence extends beyond individual applications and contributes to a broader transformation of the financial ecosystem. AI is reshaping competitive dynamics, redefining job roles, and influencing how financial services are delivered globally.

Impact:

- Accelerates innovation in financial products and services.
- Drives collaboration between finance and technology sectors.
- Shapes the future structure of global financial systems.

Conclusion

The integration of artificial intelligence into the financial sector represents a significant transformation in how financial systems operate, adapt, and evolve. This research has demonstrated that AI is no longer a supplementary technology but a foundational element shaping modern financial practices. By enabling faster data processing, improved analytical accuracy, and automated decision-making, artificial intelligence has enhanced the efficiency, reliability, and resilience of financial institutions.

The study highlights that AI-driven applications have redefined key financial functions such as trading, risk assessment, fraud prevention, credit evaluation, regulatory compliance, and customer engagement. These applications allow financial organizations to move from reactive decision-making to predictive and strategic approaches. The ability of AI systems to continuously learn from data has enabled institutions to respond more effectively to market volatility, emerging risks, and changing customer expectations.

Despite its advantages, the research also underscores that the adoption of artificial intelligence introduces new challenges that cannot be overlooked. Issues related to data quality, algorithmic transparency, ethical responsibility, and regulatory alignment remain critical concerns. Over-reliance on automated systems without appropriate governance may lead to unintended consequences, emphasizing the importance of maintaining human oversight and accountability within AI-driven financial processes.

Looking ahead, the future of artificial intelligence in finance depends on achieving a balanced integration of technological innovation and responsible governance. Financial institutions must invest not only in advanced AI tools but also in ethical

frameworks, regulatory cooperation, and skill development to ensure sustainable implementation. As AI technologies continue to mature, their role in shaping financial stability, inclusion, and innovation is expected to grow further.

In conclusion, artificial intelligence holds the potential to redefine the financial landscape by fostering smarter, more adaptive, and transparent financial systems. When implemented thoughtfully, AI can serve as a powerful catalyst for long-term growth and stability in the global financial ecosystem. This research contributes an original and structured perspective to the ongoing discourse on artificial intelligence in finance, offering insights that may guide future academic research and practical applications.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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