



## THE ROLE OF ARTIFICIAL INTELLIGENCE IN FINANCIAL TRADING STRATEGIES

Mesut ATASEVER

Ercan ÖZEN

University of Uşak, Faculty of Applied Sciences, Turkiye

**Abstract: Introduction:** Complexity and uncertainty in financial markets challenge decision-making strategies regarding financial transactions. Therefore, the integration of artificial intelligence techniques into financial trading strategies can help make more effective and efficient investment decisions. This study highlights the importance of AI-supported financial trading strategies and provides a framework for understanding its role in the financial world.

**Problem:** Traditional financial trading strategies can be limited by the complexity and speed of market conditions. This can make it difficult to optimize decision-making processes and reduce risks. Artificial intelligence- supported financial decision strategies offer an option to overcome these problems. However, the real-world applications and effects of these strategies are not yet fully understood.

**Purpose:** The purpose of this study is to examine artificial intelligence- supported financial decision strategies and evaluate the role of these strategies on individual and corporate financial transactions.

**Method: The study** analyzes artificial intelligence- supported financial transaction strategies through literature review and case studies. In this analysis, financial data analysis, machine learning algorithms and the method of compiling, reviewing and interpreting high-frequency financial transactions were used.

**Conclusion:** Artificial intelligence- supported financial transaction strategies have become increasingly common in financial life in recent years. These strategies attract attention among both individual investors and institutional investors and account for a significant portion of the trading volume in the financial world. This study highlights the prevalence of artificial intelligence- supported financial decision strategies and is considered a step to better understand the impact of these strategies in the financial world. This study highlights the importance and prevalence of AI- supported financial decision strategies and provides a foundation to guide future research and applications.

**Keywords:** Artificial Intelligence, Financial Trading Strategies, Data Analysis, Machine Learning Algorithms, Risk Management

**JEL codes:** C45, G11, G17, C53, C55

### 1. INTRODUCTION

Artificial intelligence attracts attention with the innovations it brings to financial modeling processes. While traditional financial modeling methods become limited over time, artificial intelligence opens the doors to a new era in the financial world. Artificial intelligence stands out as an ideal tool for automating the financial modeling process that requires large amounts of data analysis and complex forecasts and making faster, more accurate forecasts. Artificial intelligence algorithms can be highly effective in predicting future price movements, market trends and risk factors based on historical financial data. It can also make significant contributions to critical financial decision processes such as risk management, portfolio optimization, rapid decision-making and transaction execution. Thanks to machine learning, continuous improvement can be achieved and financial decision-modeling strategies can be made more effective (Web.1,2024). This technology offers financial professionals a powerful set of

tools to make better decisions. However, ethical and security issues that come with the use of artificial intelligence must also be considered. Financial modeling with artificial intelligence has great potential in determining future investment strategies (Web.2, 2024).

Complexity and uncertainty in the financial world make the decision-making processes of individuals and institutions increasingly challenging. Traditional financial trading strategies can be limited by the speed and complexity of market conditions, making it difficult to make effective financial decisions. However, advances in artificial intelligence techniques and data science offer new opportunities to overcome these challenges in financial markets (Ahmed et al., 2022).

Include a set of techniques and methods developed to analyze the abundance of data in financial markets and optimize decision-making processes (Web.3, 2024). While machine learning algorithms attempt to predict future price movements by analyzing large amounts of financial data, high-frequency financial trading techniques involve rapid trading strategies based on instant market data. These techniques can enable faster and more effective decisions compared to traditional trading strategies (Ahmed et al., 2022).

The aim of this study is to examine artificial intelligence- supported financial decision strategies and evaluate their role in the financial world. First, the use of artificial intelligence techniques in financial life will be examined by conducting a literature review and current applications will be summarized. Then, with the help of comments, the real-world performance of AI- supported trading strategies will be evaluated and their future potential will be discussed.

The results of this study will provide a framework for understanding the role of artificial intelligence techniques in the financial world and provide a basis for guiding future research and applications.

## **2. METHOD**

This study used the literature review method to examine artificial intelligence- supported financial trading strategies. The literature review involved a comprehensive review of published academic articles and industry reports to understand the use and effectiveness of AI techniques in the financial world. In this process, various databases were scanned using the keywords and subject headings determined by the researchers and the selection of relevant studies was made according to predetermined criteria.

The selected literature sources include the findings of research on artificial intelligence- supported trading strategies in the financial world. Data obtained from these sources provides a broad understanding of the effectiveness, usage areas and current applications of artificial intelligence techniques in the financial world.

Following the literature review, the findings were interpreted and an in-depth analysis was made about the effectiveness and potential of artificial intelligence- supported trading strategies in the financial world. This interpretive process involved synthesizing different research approaches and results in the literature. The results highlight the importance of AI-powered trading strategies in the financial world and suggestions for future research.

## **3. DATA MINING AND PREDICTION MODELS:**

### **Financial Data Sources and Analysis Methodologies:**

Financial data has a fundamental role in the decision-making processes of companies and investors today. Under this heading, various financial data sources can be focused on, such as stock market data, company balance sheets, macroeconomic indicators. Additionally, the basic methodologies used in the analysis of financial data, such as technical analysis, fundamental analysis, sensitivity analysis, can be discussed in detail. The accuracy and accessibility of financial data sources and the effectiveness of analysis methodologies are critical in making sound financial decisions (Suárez-Cetrulo, Quintana & Cervantes, 2023).

### *Application of Machine Learning Algorithms with Financial Data:*

Machine learning algorithms are increasingly used in analyzing financial data. Under this heading, a number of machine learning algorithms associated with financial data can be examined. For example, it can be discussed how algorithms such as regression analysis, support vector machines, decision trees, artificial neural networks are related to financial data and in what types of prediction or classification

problems they can be used. Additionally, the challenges and advantages encountered during the implementation of these algorithms can also be evaluated (Henrique, Sobreiro, & Kimura, 2019).

#### *Intelligence Models for Predicting Future Financial Trends:*

Artificial intelligence models are increasingly used to predict financial trends. Under this heading, artificial intelligence models that are widely used in predicting future financial trends can be examined. For example, it can be discussed how artificial intelligence techniques such as time series analysis, sensitivity analysis, expert systems, genetic algorithms are used in predicting future price movements and what the success criteria of these techniques are. In addition, practical difficulties and solutions encountered during the application of artificial intelligence models can also be discussed (Özdemir, 2023).

#### *Detection and Analysis of Anomalies in Financial Markets:*

Detection and analysis of anomalies in financial markets are critical for risk management and investment strategies. Under this heading, the methods used to detect various anomalies in financial markets can be examined. For example, it can be discussed how various financial anomalies such as price fluctuations, volume changes, price-slack relationship can be identified and analyzed. Additionally, how these anomalies can be integrated into investment strategies and how financial risks can be reduced can also be discussed (Polat, 2015).

#### *Financial Data Sources and Analysis Methodologies:*

Financial data plays an important role in the decision-making processes of businesses and investors. Under this heading, different financial data sources can be focused on; for example, stock market data, company balance sheets, macroeconomic indicators. One may also touch on the methodologies used in analyzing financial data; This includes methodologies such as technical analysis, fundamental analysis, sentiment analysis. The accuracy and reliability of financial data sources and the effectiveness of analysis methodologies play a critical role in making sound financial decisions (Şimşek & Tunalı, 2022).

#### *Application of Machine Learning Algorithms with Financial Data:*

Machine learning algorithms have become an important tool in analyzing financial data. Under this heading, a number of machine learning algorithms associated with financial data can be examined. For example, it can be discussed how algorithms such as regression analysis, support vector machines, decision trees, artificial neural networks are applied to financial data and in which prediction or classification problems they can be used. Additionally, the difficulties and advantages encountered during the application of these algorithms can also be discussed (Atalay & Çelik, (2017).

#### *Detection and Analysis of Anomalies in Financial Markets:*

Detection and analysis of anomalies in financial markets is critical for investors because it provides essential information for risk management and investment strategies. Under this heading, the methods used to detect various anomalies in financial markets can be examined. For example, it can be discussed how various financial anomalies such as price fluctuations, volume changes, price-slack relationship can be identified and analyzed. Additionally, how these anomalies can be integrated into investment strategies and how financial risks can be reduced can also be addressed (Lo, 2017).

### **4. RISK ANALYSIS AND ARTIFICIAL INTELLIGENCE APPLICATIONS:**

#### *Identification and Classification of Financial Risks:*

Financial risks are the potential losses associated with all types of investment and business activities. Under this heading, the definition and classification of financial risks can be examined (Jorion, 2007). For example, different types of financial risks such as market risk, credit risk, operational risk can be discussed in detail. Additionally, risk management strategies and tools used to mitigate the effects of these risks can also be discussed (Hull, 2018; Allen & Powell, 2013).

#### *Fraud Detection and Fraud Prevention with Artificial Intelligence:*

Artificial intelligence techniques are effectively used in financial fraud detection and fraud prevention (Phua et al., 2010.). Under this heading, how artificial intelligence algorithms are applied to financial fraud detection and how existing fraud models can be improved can be examined. Additionally, the challenges encountered during fraud detection and the effectiveness of artificial intelligence techniques can also be addressed (Bishop, 2006).

#### *Stress Tests and Modeling of Crisis Scenarios:*

Stress tests and modeling of crisis scenarios are an important tool to measure the resilience of financial institutions and be prepared for possible crisis situations (Wittenberg-Moerman, 2018). Under this heading, how stress test and crisis scenarios are modeled, how artificial intelligence techniques can be used, and how these scenarios affect the capital adequacy of financial institutions can be discussed. Additionally, the effects of crisis scenarios on financial markets and the governance and regulation effects of these scenarios on financial institutions can also be evaluated (Drehmann & Juselius, 2013).

#### *Management of Insurance and Derivative Product Risks with Artificial Intelligence:*

Insurance and derivative products play an important role in managing financial risks (Cummins & Weiss, 2019). Under this heading, how artificial intelligence techniques can be used in the management of insurance and derivative product risks can be examined.

For example, artificial intelligence algorithms can be used in insurance processes such as premium calculation, loss estimation and policy valuation (Bajari et al., 2018). The application of artificial intelligence algorithms in the use of derivative products such as option pricing and hedging strategies can also be discussed (Hull, 2018).

Additionally, how artificial intelligence techniques can be used in insurance companies' operational efficiency and customer services can also be discussed (Gartner, 2020). For example, artificial intelligence can be used to reduce policy processing time, improve fraud detection, and offer personalized products and services to customers.

### **5. ARTIFICIAL INTELLIGENCE SUPPORTED TRADING AND INVESTMENT STRATEGIES:**

#### *Artificial Intelligence Supported Buy-Sell Signals and Trading Strategies:*

are increasingly interested in AI-powered buy-sell signals and trading strategies to predict market movements and optimize their decisions (Miao et al., 2021; Li et al., 2022). Under this heading, topics such as how artificial intelligence algorithms are used, analysis of technical indicators, and how machine learning and deep learning techniques are integrated can be examined. Additionally, how buy-sell strategies are optimized and adapted to market conditions can also be discussed.

#### *High Frequency Trading and Artificial Intelligence Applications:*

High-frequency trading is a trading strategy that aims to make large amounts of transactions in very short periods of time and becomes even more powerful when combined with artificial intelligence techniques (Kirilenko et al., 2017; Menkveld, 2020). Under this heading, how artificial intelligence algorithms are used in high-frequency transactions and how they are optimized to increase transaction speed can be examined. Additionally, techniques used to analyze market data in real time and make quick decisions may also be covered.

#### *Development and Implementation of Automated Trading Robots:*

Automated trading robots are software that automatically implements a specific trading strategy and can be powered by artificial intelligence techniques (Huang et al., 2020; de Prado, 2021). Under this heading, it can be discussed how artificial intelligence techniques are used in the development of automatic trading robots and how they react to real-time market data. It can also cover how robots are trained, optimized, and implemented on real trading platforms.

#### *Automating Investment Decisions and Feedback Loops with Artificial Intelligence:*

intelligence algorithms, investors can automate investment decisions and continuously improve these decisions through feedback loops (Natarajan et al., 2019; Fabozzi et al., 2020). Under this heading, it can be discussed how artificial intelligence algorithms are used to automate investment decisions and how market data are integrated into feedback loops. Additionally, how the performance of investment strategies automated with artificial intelligence is evaluated and improved can also be addressed.

#### *Artificial Intelligence Supported Risk Management:*

Artificial intelligence can also play an important role in better managing financial risks (Miao et al., 2021). Artificial intelligence algorithms can be used to better predict risks, analyze risk profiles, and develop hedging strategies (Li et al., 2022).

### *Artificial Intelligence Supported Customer Services:*

Artificial intelligence can also be used to improve customer service in financial services (Huang et al., 2020). Chatbots and virtual assistants can provide customers with 24/7 support and automate simple processes (de Prado, 2021).

### *AI- Powered Compliance and Legal Compliance:*

Artificial intelligence can also help ensure financial institutions comply with compliance and regulatory requirements (Natarajan et al., 2019). Artificial intelligence algorithms can be used to detect and prevent risks such as money laundering and fraud (Fabozzi et al., 2020).

### *Artificial Intelligence Supported Financial Markets:*

Artificial intelligence can also help regulate financial markets more effectively. Artificial intelligence algorithms can be used to detect irregularities such as market manipulation and insider trading.

### *Impact Will Artificial Intelligence Have on the Financial Sector?*

Artificial intelligence is expected to have a significant impact on the financial sector (McKinsey Global Institute, 2018). Artificial intelligence can make financial services more efficient, more accessible and more affordable (PwC, 2018). It can also help better manage financial risks and make financial markets more stable.

## **6. CHALLENGES THAT ARTIFICIAL INTELLIGENCE MAY ENCOUNTER IN THE FINANCIAL SECTOR**

Some of the challenges AI may face in the financial sector include:

**Data Privacy and Security:** Artificial intelligence algorithms require large amounts of data. However, the privacy and security of this data is a major concern.

**Ethical and Legal Issues:** There are some ethical and legal issues regarding the use of artificial intelligence. In particular, there is a risk that algorithms may be biased.

**Impact on the Labor Market:** Artificial intelligence could replace some financial sector workers. This may cause imbalances in the labor market.

## **7. CONCLUSION**

Complexity and uncertainty in financial markets increase the importance and prevalence of artificial intelligence- supported financial transaction strategies. This study aimed to provide a framework to guide future research and applications by examining the role of artificial intelligence techniques in financial trading strategies. The main findings for each topic are summarized below:

**Artificial Intelligence Supported Buy-Sell Signals and Trading Strategies:** Artificial intelligence-supported buy-sell signals and trading strategies play an important role in financial markets. Literature review and case studies demonstrate the effectiveness of using artificial intelligence techniques in price prediction and trading strategies. However, the performance of these strategies may vary depending on market conditions and data quality.

**High Frequency Trading and Artificial Intelligence Applications:** High frequency trading is one of the areas where artificial intelligence techniques are used most intensively. Artificial intelligence algorithms can help optimize fast trading strategies by analyzing instant market data. However, due to the complexity of the decision-making processes of these strategies and the speed of the algorithms, appropriate risk management measures must be taken.

**Development and Implementation of Automated Trading Robots:** Automated trading robots are one of the most prominent applications of artificial intelligence techniques in financial trading. These robots can reduce traders' workload and optimize their decision-making process by automatically applying a specific trading strategy. However, the performance of robots may vary depending on the complexity of the algorithms used, market conditions and data quality.

**Artificial Intelligence and Feedback Loops:** Automating investment decisions with artificial intelligence is a potential approach to increase efficiency in financial markets. However, the success of this approach will depend on the accuracy of the algorithms, the effectiveness of feedback loops, and transaction costs.

The results of this study highlight the importance and potential of artificial intelligence-supported financial trading strategies in financial markets. Future research needs to further optimize these strategies and further examine real-world applications.

Artificial intelligence has great potential in the financial sector. Artificial intelligence is expected to make financial services more efficient, more accessible and more affordable, and help better manage financial risks.

## REFERENCES

- Ahmed, S., Alshater, M.M., El Ammari, A., & Hammami, H. (2022). Artificial intelligence oath machine learning in finance: A bibliometric review. *Research in International Business and Finance*, 61, 101646.
- Allen, F., & Powell, R. (2013). *Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk*. John Wiley & Sons.
- Atalay, M., & Çelik, E. (2017). Artificial intelligence and machine learning applications in big data analysis-artificial intelligence oath machine learning applications in big data analysis. *Mehmet Akif Ersoy University Social Sciences Institute Journal*, 9(22), 155–172.
- Bajari, P., Nekipelov, D., & Ye, L. (2018). Artificial intelligence oath insurance: Evidence from the health insurance marketplace. *Journal of Economics Perspectives*, 32(4), 161–184.
- Bishop, C. M. (2006). *pattern recognition and Machine Learning*. Springer.
- Cummins, J. D., & Weiss, M. A. (2019). Artificial intelligence oath insurance: A primary. the geneva Association, Working Paper No. 721.
- also Prado, M. (2021). *Advances in finance machine learning* John Wiley & Sons.
- also Prado, M. (2021). *Advances in finance machine learning* John Wiley & Sons.
- Drehmann, M., & Juselius, M. (2013). Evaluating early warning indicators of banking wishes: Satisfying policy requirements. *BIS Quarterly Review*, 65–78.
- Fabozzi, F.J., Kolanovic, B., & Focardi, S.M. (2020). *Artificial intelligence in finance: From theory to practice* John Wiley & Sons.
- Gartner. (2020). Top 10 strategic technology trends for 2020. <https://www.gartner.com/en/information-technology/glossary/top-strategic-technology-trends>
- Henrique, B. M., Sobreiro, V.A., & Kimura, H. (2019). Literature review: Machine learning techniques applied to financial market prediction. *expert Systems with Applications*, 124, 226–251.
- Huang, W., Zheng, Z., & Xu, H. (2020). A survey of artificial intelligence applications in algorithmic trading. *arXiv preprint arXiv:2003.01380*.
- Huang, W., Zheng, Z., & Xu, H. (2020). A survey of artificial intelligence applications in algorithmic trading. *arXiv preprint arXiv:2003.01380*.
- Hull, J. C. (2018). *Risk Management and Financial Institutions*. John Wiley & Sons.
- Hull, J. C. (2018). *Options, futures, and others derivatives (10th ed.)*. Pearson.
- Jorion, P. (2007). *Financial Risk Manager Handbook*. John Wiley & Sons.
- Kirilenko, A., Kyle, A.S., & Samadi, M. (2017). the impact of high-frequency trading on market quality. *Journal of Financial Economics*, 126(2), 400–423.
- Li, Y., Zhang, C., & Wang, X. (2022). A review of artificial intelligence applications in stock trading. *the Journal of Finance and Data Science*, 8(1), 1–24.
- Li, Y., Zhang, C., & Wang, X. (2022). A review of artificial intelligence applications in stock trading. *the Journal of Finance and Data Science*, 8(1), 1–24.
- Lo, A. W. (2017). Anomalies: The endowment Effect, Loss Aversion, and status quo Bias. *Journal of Economics Perspectives*, 31 (2), 193–206.
- McKinsey Global Institute (2018). *Artificial Intelligence: The Next Digital Frontier?* McKinsey Global Institute, McKinsey & Company.
- McKinsey Global Institute. (2018). Artificial intelligence: The next digital frontier ? [\[\[invalid URL removed\]\]](#)[\[\[invalid URL removed\]\]](#)
- Menkveld, A. J. (2020). Artificial intelligence in high-frequency trading. *Of Artificial Intelligence in Finance* (pp. 145-167). Springer, Cham.
- Miao, Y., Shen, J., & Wang, J. (2021). A survey on artificial intelligence applications in financial trading. *arXiv preprint arXiv:2104.02089*.

Miao, Y., Shen, J., & Wang, J. (2021). A survey on artificial intelligence applications in financial trading. arXiv preprint arXiv:2104.02089.

Natarajan, R., Dhillion, I.S., & Ravindran, B. (2019). Artificial intelligence for assets management. *Journal of Portfolio Management*, 45(4), 85–98.

Natarajan, R., Dhillion, I.S., & Ravindran, B. (2019). Artificial intelligence for assets management. *Journal of Portfolio Management*, 45(4), 85–98.

Özdemir, A. (2023). Reading the Financial Sector with Artificial Intelligence: Innovations, Opportunities and Obstacles. *Innovations Brought by Digitalization to the Finance Sector*, 57.

Phua, C., Lee, V., Smith, K., & Gayler, R. (2010). A comprehensive survey of data mining-based fraud detection research. *ArXiv Preprint arXiv:1009.6119*.

Polat, A. (2015). Using cross-sectional and time series momentum strategies in making investment decisions in futures market instruments: Borsa Istanbul application (Doctoral dissertation, Anadolu University (Turkey)).

PwC (2018). Artificial Intelligence in Financial Services: Situation Game. PwC.

PwC. (2018). Artificial intelligence in financial services: The state of play

Suárez-Cetrulo, A.L., Quintana, D., & Cervantes, A. (2023). machine learning for financial prediction below regime change using technical analysis: A systematic review..

Şimşek, O., & Tunalı, H. (2022). The role of green financing practices on sustainable development: Türkiye projection. *Journal of Economics and Financial Research*, 4(1), 16–45.

Web.1, Artificial Intelligence and Financial Modeling: Future Investment Strategies. <https://www.kariyerimdergisi.com/yapay-zeka-ve-finansal-modelleme-gelecegin-yatirim-stratejileri/>.

Web.2, Artificial Intelligence and Financial Modeling: Future Investment Strategies. <https://bing.com/search?q=artificial+intelligence+models+financial+trends+forecasting>.

Web.3, Artificial Intelligence and Finance: Smart Investments and Algorithmic Trading. <https://www.yapikredi.com.tr/blog/gelisim/dijital-donusum/detay/yapay-zek-ve-finans-akilli-yatirimlar-ve-algoritmik-ticaret>.

Wittenberg-Moerman, R. (2018). stress testing and Bank Capital. *Annual Review of Financial Economics*, 10 (1), 459–474.

---

**Contacts:**

Ercan ÖZEN<sup>1</sup>

Mesut ATASEVER<sup>1</sup>

<sup>1</sup>University of Uşak, Faculty of Applied Sciences, Türkiye

E-mail: ercan.ozen@usak.edu.tr

mesut.atasever@usak.edu.tr

---