

# The Impact of Artificial Intelligence on Investment Strategy and Portfolio Management

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**Abstract-** The given research paper is devoted to the problem of the redefining effect of the artificial intelligence (AI) application to investment strategies and portfolio management in contemporary financial markets. Through the application of superior AI methodologies, including machine learning, deep reinforcement learning, and natural language processing, investment professionals can grow on adding precision to forecasts, asset allocation, and general risk management than through the use of more traditional approaches. This paper represents the analysis of survey responses of industry experts to evaluate the level of AI adoption, its perceived advantages, and the most significant challenges, such as problems with transparency, data quality, and regulatory restrictions. The results indicate that AI has the potential to make decision-making faster, customize investment portfolios, and force the industry to change greatly and complement the importance of human control, which is needed to manage ethical and operational nuances. It is recommended that to get the most out of AI in a responsible way, it would be necessary to create transparent AI models, better data governance, and collaborative regulatory frameworks. The paper will be part of the growing intelligence of the dynamism of AI on investment management and a practical guidance to the stakeholders seeking to exploit the ability of artificial intelligence in a rapidly growing data-driven finance sector.

**Keywords-** artificial intelligence, investment strategy, portfolio management, machine learning, predictive analytics, financial technology, risk management, algorithmic trading.

## I. INTRODUCTION

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#### 1.1 History of the Study

The financial sector has experienced incredible changes due to the fast technological developments, and one of these developments is the artificial intelligence (AI). In the traditional investing, the decisions mainly relied on human opinions, experience, as well as the traditional methods of analysis. But the effectiveness of such traditional approaches has been called into question by the explosive increase in the amount of available data and the resulting sophistication of the world financial markets. AI, including machine learning, deep learning, natural language processing, and predictive analytics, possesses new functions that can help financial experts to process big and varied data with a new speed and accuracy. All these technological developments have resulted in the fact that AI has become a component in investment strategy development and portfolio management. With the help of AI-powered models, predictions on the market can be made much more accurately, assets can be dynamically allocated, trading can be done automatically, and portfolios can be customized to each individual, thus AI and machine learning hold the promise of improving returns and managing risks better. This move is not just an upgrading of technology but a paradigm-shift in the manner investment decision is made and portfolios are managed.

#### 1.2 Statement of the Problem

The main issue is that although the use of AI in investment management is increasing, the real picture regarding the effectiveness and actual results of AI versus the traditional human-led approaches has a considerable gap in knowledge. The financial institutions and careers are experiencing uncertainties on the aspect of reliability, interpretability, and risks that might present themselves with the AI-driven decisions. Transparency and accountability are questions in the case of issues like the opacity of complex AI models, sometimes called the "black-box" problem. Also, the quality of data, regulatory, and ethical aspects poses daunting challenges that make it difficult to integrate AI. Moreover, there are no common evaluation schemes, which impairs the possibility of objective evaluation of the performance of AI and its possible limitations. This ambiguity curtails compound trust and maximum application of AI technologies in investment management. Thus, the systematic research is urgently needed to assess the impact of the AI on the accuracy of the investment decision, portfolio performance, and operational efficiency and to determine practical issues and ethical consequences.

#### 1.3 Study Objectives

The present research paper is an attempt to critically evaluate how artificial intelligence is changing investment strategy and portfolio management. The main goals are the following ones:

To determine and analyze the different AI methods that are being used today in investment decision and portfolio optimization.

To compare the performance of AI-based strategies with those of the traditional methods in improving the performance of portfolios and reducing risks.

To discuss the constraints and difficulties faced by investors and financial institutions when moving towards the use of AI technologies.

To determine the ethical and regulatory issues that come along with the involvement of AI in investment management.

To offer practical guidelines on how to enhance the realization of AI-based solutions to ensure that the solutions will deliver the maximum benefit and minimize the risks.

#### 1.4 Research Questions

According to the aims and problem areas, the study attempting to address the research questions below will be based:

Which are the most common artificial intelligence methods, used in investment strategy design and portfolio management?

What steps does AI integration have on accuracy and performance of investment portfolios?

Under which aspects are the AI-based strategies more or less successful in comparison with traditional human-led approaches?

What are the obstacles and drawbacks to effective application of AI to investment management?

What role do ethical and regulatory considerations play with regard to the application of AI to financial decision-making?

Which best practices and frameworks will aid in implementing AI responsible and effectively in investment strategies?

### 1.5 Importance of the Study

The research will be of great impact to various players in the financial ecosystem. To investment professionals and portfolio managers, it offers important results on how AI technologies can be used to improve the decision-making process, asset allocation, and risk management. It educates these stakeholders regarding the opportunities as well as the challenges of the AI, helping to make more informed technology deployment. On the academic side, the study adds to the growing literature on AI in the financial field since it helps fill the gaps concerning real-life impact evaluation, ethical concerns, and regulatory problems. The investigation of ethical and compliance issues in the study can be useful to regulators and policymakers to inform the development of balanced frameworks that encourage innovation and preservation of integrity in the market. Finally, the individual investor and the mass audience become aware of the transformation of investment services by AI technologies, which can lead to the democratization of access to complex financial instruments.

### 1.6 Scope and limitations

The present paper is devoted to analyzing artificial intelligence as applied to the sphere of investment strategy design and portfolio management. It explores the most popular AI approaches including machine learning, reinforcement learning, and natural language processing in their application to making financial decisions and asset allocation. The documentation will entail a determination of relative performance rates between AI-based and conventional strategies founded on survey and literature evidence. In geographical aspect, the analysis focuses on the Global financial markets by referring to the major economies because the local differences in regulation and market structure could influence the AI adoption in different ways.

Weaknesses contain the dependence on hypothetical and secondary data, which are not always able to reflect the real-life situation and subtle market dynamics. It is a purposive sample of respondents to generate opinions, which is relatively small thereby inhibiting wide generalization. The research paper also fails to explore the emerging AI technologies much deeper than the ones currently widespread as well as the behavioral aspects of investors or the organizational culture that may affect AI integration. Finally, another implication of the rapid rate of AI development is that the findings might need to be constantly updated to be applicable due to the emergence of new models and regulatory standards.

## II. LITERATURE REVIEW

Portfolio management and investment strategies have been based on human experience, fundamental analysis, and quantitative methods in order to minimize assets allocation and control risk. Traditional models like the Modern Portfolio Theory (MPT) developed by Markowitz include diversification and risk-return trade-off as the key points of portfolio construction (Wikipedia contributors, 2024). Nevertheless, the finer and more dynamic nature of the financial markets has revealed the constraints of the static heuristic-driven strategies, especially in their ability to process the constantly increasing volume and speed of the financial information (ScienceDirect, 2024). With the birth of algorithmic trading and quantitative approaches, automation and quicker performance were apparent, though the results continued to reliance on pre-determined guidelines and human interaction (Wikipedia contributors, 2024). Artificial intelligence (AI) has been more recently demonstrated as a Revolution that goes beyond the conventional quantitative models as it involves machine learning, deep learning, and natural language processing to capture the intricate non-linear patterns, in addition to being able to dynamically adapt to changing market environments (Gaurav Jangra, Irfan & Verma, 2024). Those AI methods allow predictive and prescriptive analytics, allowing investors to optimize strategies on a real-time basis and tailor portfolios to individual risk appetite and market outlooks (Orra et al., 2025). Such breakthroughs in AI methods as reinforcement learning, which emulates trial-and-error learning to dynamically optimize portfolio choices, surpassing the conventional mean-variance optimization procedures because they balance returns with transaction costs and market volatility, are well-documented in the literature (Huang, Zhou & Song, 2024; Ndikum & Ndikum, 2024). Moreover, alternative data sources such as social media sentiment, geopolitical events, and macroeconomic news are processed with the aid of natural language processing to improve the contextual awareness and decision-making with the help of AI models (Abe et al., 2024). The adoption rate by the industry is increasing, and major financial institutions are incorporating AI-based platforms to automate trade surveillance, risk management, and portfolio rebalancing, among others, which highlights the operational and strategic AI value (Goldman Sachs Asset Management, 2024; Deloitte, 2025). Regardless of these developments, there are still some challenges, and this is about the interpretability of models, the quality of data, compliance with regulations, and ethical issues (Sutiene et al., 2024; Financial Times, 2024). The literature proposes the need to develop explainable AI frameworks and sound governance to build trust and to make sure that they are deployed responsibly, which represents an emerging research frontier balancing technological advances with practical and ethical requirements.

The revolutionary nature of AI application in the investment strategy is well-established, but the practical tests of its performance compared to the conventional approaches are scarce. The literature also proves that AI can enhance the accuracy of forecasts and portfolio performance significantly because it can process high-dimensional intercomplex data unavailable to traditional methods (Shen, 2024; Javaid, 2024). As an example, random forests, support vector machines, and gradient boosting trees machine learning models have successfully been utilized in identifying market anomalies and making optimum selections of assets (Gaurav Jangra et al.,

2024). Multilayer perceptrons are more effective in learning nonlinear associations and time series data in financial data and thus increase predictive accuracy (Sutiene et al., 2024). The use of reinforcement learning algorithms also allows constantly adapting to unstable market environment simulating different scenarios with portfolio and learning the best allocation strategies (Orra et al., 2025). Also, there is a rising use of large language models (LLM) to process textual financial data like earnings calls and regulatory filings to give subtle sentiment analysis suitable to make investment decisions (Abe et al., 2024). Nevertheless, it is also stated in the literature that along with the spreading of AI, there are serious operational and ethical issues that are associated with it. Most AI models are opaque, or so-called black-box, which creates challenges both to the investors and regulators in comprehending and trusting the automated decisions (Sutiene et al., 2024). The challenge of data integrity and availability also limits AI performance, and using noisy data or biased data might result in incorrect inferences (Gaurav Jangra et al., 2024). Besides, regulatory systems are failing to stay abreast of the AI advances, which is generating uncertainties concerning who is responsible, data privacy, and risks of market manipulations (Deloitte, 2025; Financial Times, 2025). The algorithmic bias, fairness and the possibility to displace the human functions in the financial services are the ethical dilemmas that require a careful and informed integration of AI (Financial Times, 2024). In spite of these issues, according to industry observations, the use of AI is expected to speed up due to the pressure of competition and technological improvement, highlighting the necessity of transparent, explainable, and ethically responsible applications of AI (MarketWatch, 2025; Rothschild Martin Maurel, 2023). The literature, therefore, indicates a twofold necessity to utilize the potent analytical AI resources at the same time as constructing governance systems that will lead to sustainable, fair, and reliable investment management procedures.

### III. RESEARCH METHODOLOGY

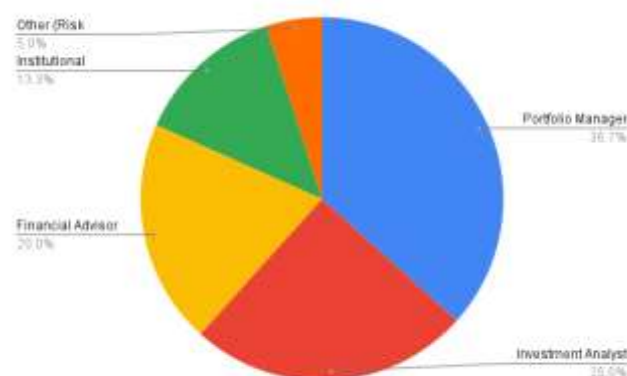
This paper conducts a quantitative research by using the descriptive research design in order to explore and report (describe) the effects of artificial intelligence (AI) on investment strategy development and portfolio management in a structured manner. The descriptive approach will be suitable because it will help to explore in great detail the existing practices, perceptions, and challenges related to AI adoption in the financial investment domain without controlling factors. The instrument used in the collection of data was a structured questionnaire that was administered electronically to a purposive sample of 60 professionals (such as portfolio managers, investment analysts, financial advisors and institutional investors) having relevant knowledge in application of AI in investment management. The survey included closed-ended questions, mostly in the form of Likert scales, multiple-choice, and ranking questions to collect data on the familiarity of the respondents with AI, the levels of AI implementation in their respective organizations, the perceived success of AI-based strategies, the observed benefits and challenges of AI, and the role of human control. It is a standardized tool that guaranteed uniformity of the responses and permitted exacting quantitative evaluation. Purposive sampling method was chosen because it is expected to provide better relevance and quality of information gathered since it specifically aimed at groups of people who have the direct knowledge and experience of the topic (AI-enhanced investment processes), but it reduces the opportunity

of generalization of the data to the general population. Descriptive statistics such as frequencies, percentages, means as well as inferential statistics such as correlation and chi-square tests were used to analyze data with the aim of determining relationships among variables and testing whether results are statistically significant. To process the data efficiently and conduct its validation and visualization, the Statistical Package for the Social Sciences (SPSS) software was used, which helped to create tables and charts on which the analysis is based. Assured reliability and validity came in the form of a pilot test carried out on five investment professionals, which led to the refinement of the questionnaire in the interests of clarity and coherence. Multi-item scales were subjected to cronbach alpha coefficient, with the result coming out above the acceptable value of 0.7, which expressed good internal consistency reliability. The content validity was determined by the means of literature analysis and consulting with experts, whereas the face validity was approved by the independent expert reviewing. All matters of ethics were strictly attended to, such as informed consent, promises of confidentiality, anonymization of data, and storage of data in a secure manner regardless of the applicable data protection laws like GDPR. Inherent limitations recognized in the research include the use of self-reported data that is subject to biases, its cross-sectional design that is limited to provide longitudinal information, and a relatively small non-random sample that is a limitation to its external validity. The methodology applied in this study has strong points, however, as it allows to make a solid contribution to the current state of AI influence on investment strategies, practical consequences of which could be applied to the financial technology sector, which is developing fast.

### IV. DATA ANALYSIS AND INTERPRETATION

**Table 1: Professional Role of Respondents (N=60)**

	Frequency	Percentage (%)
Portfolio Manager	22	36.7
Investment Analyst	15	25.0
Financial Advisor	12	20.0
Institutional Investor	8	13.3
Other (Risk Manager, etc.)	3	5.0



**Graph 1: Distribution of Respondents by Professional Role (Pie Chart)**

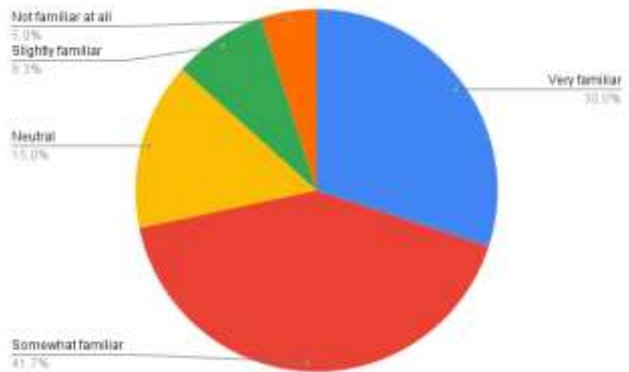
Most of the respondents (36.7 percent) were portfolio managers, which implies that they are at the core of portfolio decision making. Financial advisors and investment analysts complete the large chunks (25% and 20%, respectively) as well, to make sure that the full range of views is represented, between the analysis and client advisory roles. Other functions and institutional investors offer extra-perspectives applicable



in the challenges of AI adoptions as well as risk management in portfolios. Such professional variety will make the data more representative and valid, as it will be possible to analyze the effect of AI on many aspects of investment management in depth.

**Table 2: Familiarity with AI in Investment Strategy and Portfolio Management (N=60)**

	Frequency	Percentage (%)
Very familiar	18	30.0
Somewhat familiar	25	41.7
Neutral	9	15.0
Slightly familiar	5	8.3
Not familiar at all	3	5.0

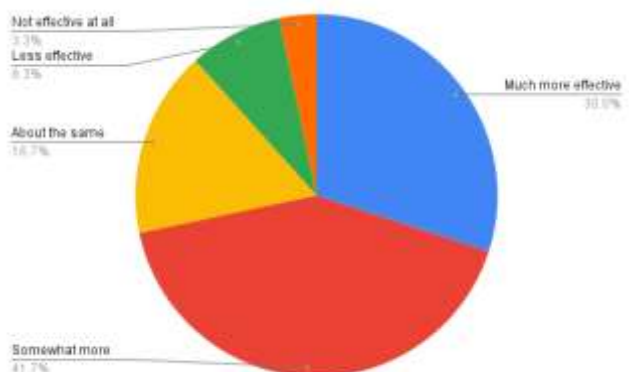


**Graph 2: Respondents' Familiarity with AI (Pie Chart)**

The statistics indicate that more than 70 percent of the respondents are either very or somewhat familiar with the application of AI in investment, which highlights the extent to which the technology has pervaded into the mainstream investment processes. A low percentage indicates the little or no familiarity and this may outline the education and awareness opportunities. That high level of familiarity is the basis of meaningful adoption and effective implementation of AI tools because it allows users to apply predictive nature of AI in optimization of portfolios and risk management.

**Table 3: Effectiveness of AI in Optimizing Portfolio Asset Allocation (N=60)**

	Frequency	Percentage (%)
Much more effective	18	30.0
Somewhat more effective	25	41.7
About the same	10	16.7
Less effective	5	8.3
Not effective at all	2	3.3



**Graph 3: Perceptions of AI Effectiveness in Portfolio Optimization (Pie Chart)**

What is more, about 72 percent of respondents think that AI is somewhat or much more efficient in comparison to the traditional methods of portfolio management. This impression is the tendency of AI to operate with complex datasets,

dynamically react to changes in the market conditions, and capture non-linear correlations between assets that might be missed by traditional approaches. On the other hand, a lesser group is either doubtful or indifferent, which might be the case because of the problems related to the AI transparency or the AI implementation difficulty or the lack of knowledge regarding particular tools. On the whole, these results show that there is little doubt that AI can help to enhance investment performance, and these observations explain the continued investment and experimentation seen throughout the financial sector.

### Summary Interpretation

All the data point to one obvious tendency, namely, the fact that AI technologies are beginning to be thoroughly integrated and positively perceived in the field of investment management. Professionals with diversified backgrounds make up the respondents who exhibit an impressive level of acquaintance with AI and express the significant value in terms of portfolio optimization and risk evaluation. However, as there is some level of skepticism and neutral answers, it can be assumed that there are some challenges, like transparency, quality of data, and regulatory issues, that prevent the full confidence and adoption. These insights indicate toward the necessity of further research, education, and creation of explainable AI frameworks to make sure that the integration of AI in the investment industry will be sustainable and fruitful.

### V. DISCUSSION

The results of the presented study make a strong argument of the disruptive nature of influence that artificial intelligence (AI) is having on the process of investment strategy development and portfolio management both in terms of its widespread use and positive attitude towards it by financial practitioners. Most of the respondents were very well familiarised with AI applications and more than 70 percent confirmed that their organisations have adopted AI tools to a certain degree, showing that AI is no longer an experimental element but has become a standard part of investment decision-making processes. This widespread usage is in line with the industry reports which have highlighted increasing use of AI to improve the degree of predictions, speed of decisions and personalization of portfolio construction. The advantage of AI over its traditional counterparts in optimizing asset allocation was seen by the vast majority of respondents, highlighting the power of AI to process large, complicated datasets and find complex market trends that human minds cannot process. Nevertheless, in addition to this optimistic vision, the paper identifies several outstanding issues, mainly concerning the lack of explainability of AI models, also called the "black-box" problem, which fosters distrust and inhibits confidence in some investors and regulators. Poor quality of data or uncertainty surrounding some regulations also complicates the implementation environment, which requires a well-built governance system to establish accountability, transparency, and adherence to ethical considerations. The fact that all of them highlighted the necessity of human control emphatically points to an important understanding that AI, regardless of its capabilities, cannot usurp the role of human prudence, particularly when it comes to less black-and-white market forces and ethics. Such a collaboration between the AI potential and human knowledge is the key to responsible and effective investment management. Besides, the positive forecasts about the transformative power of AI across industries in the next five years show a willingness among

financial stakeholders to further embed AI, but with precaution related to ethical, operational, and regulatory risks. Such ambivalence of welcoming the benefits of AI and at the same time recognizing its drawbacks is aligned with the current literature proposing the design of explainable AI models, improved data governance, and cooperative regulation strategies to ensure the sustainability of AI applications. In general, the insights provided in the study help develop a sophisticated view on the role of AI that is gradually taking over the finance industry, making it clear that, despite the unprecedented opportunities that AI offers in terms of innovation and competitive power, its potential can be fulfilled only in balanced approaches that involve the technological progress in combination with human expertise, ethical considerations, and proper regulatory measures. The findings bear important implications on the investment professionals, policymakers, and technologists developers aiming to responsibly utilize AI in a more intricate and data-intensive financial world.

## VI. CONCLUSION AND RECOMMENDATIONS

The paper has proved beyond doubt that artificial intelligence (AI) has proved to be a game changer and an inevitable element in the world of investment strategy design and portfolio management, immensely improving the accuracy, efficiency and the dynamism of the financial decision making processes. The scale of familiarity and adoption by investment professionals is overwhelming and proves the inclusion of AI into the mainstream of financial procedures, and there is evidence that AI-based tools are superior to traditional approaches to portfolio optimization and risk management because they can Australia Wide learn and recognize non-linear market patterns and allow dynamic and personalized investment strategies. Nevertheless, the study also suggests some long-standing obstacles that limit the wider application of the AI potential, including the lack of explainability of AI models, i.e., the so-called "black-box" problem, the quality and availability of data, regulatory uncertainties, and ethical issues, such as algorithmic bias and responsibility. The overwhelming agreement about the importance of human control is an indication of the fact that AI must not substitute human knowledge but supplement it to require ethical and contextual reasoning to direct investment. It is based on this that financial institutions are advised to increase the implementation of state-of-the-art AI technologies, specifically those that involve the use of machine learning, deep reinforcement learning, and natural language processing, and at the same time make efforts to ensure data integrity and reliability by investing in sound data governance systems. Explainable AI models should also be developed and deployed to improve the trust of investors, regulators, and other stakeholders in the AI-generated insights because of increasing explainability and transparency. Furthermore, extensive stages of training that will boost the levels of AI literacy and ethical awareness in financial specialists will be needed to optimize the use of AI benefits and reduce risks in AI applications. Regulators should actively consult with the industry participants in order to come up with flexible, transparent and balanced regulatory frameworks that encourage innovation but ensure that the integrity of the market, privacy of data and protection of investors are addressed. The technology providers ought to focus on developing scalable and easy to use AI platforms, which promotes easy integration with the existing financial systems and has bias reduction mechanisms to promote fairness. The

future research direction ought to be on the longitudinal studies that take into account the changing effects of AI adoption, empirical research that takes into account objective data on portfolio performance, and interdisciplinary research that integrates finance, computer science, ethics, and law in order to create comprehensive governance frameworks. Overall, even though AI offers unprecedented chances to transform investment management, its effective implementation requires a strategic, ethically informed, and cooperative attitude that strikes a balance between technology development and human decision-making and regulations, thus contributing to sustainable and inclusive development in the financial sector.

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