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Assessing the Effectiveness of AI in Investment: A Study of Benefits, Challenges, and Demographic Associations

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ABSTRACT

Investment is one of the major areas which has undergone a tremendous change after the advent and adoption of Artificial Intelligence. It has transformed the conventional investment techniques and practices. This paper analyses application of AI in investment decisions, impact of AI in investments, benefits and challenges of AI in investment and to analyse the difference in opinion on AI usage in investment with respect to gender and occupation. The methodology involves usage of both primary and secondary data. The researchers collected secondary data from research articles and primary data was collected by administering questionnaire. The researcher used statistical tests to find out the association between gender occupation and opinion that AI can help in investment. This study leverages Artificial Intelligence (AI) to investigate investment patterns and perception of investors, shedding light on the complex dynamics influencing investment decisions. The future of investment would be using AI and there is no denying to it. The Investment firms should be prepared and should be integrating AI into their mainstream of investment options.

Keywords: Artificial Intelligence (AI), Investment, Patterns, Benefits, Challenges, perception

INTRODUCTION

Investment involves allocating funds to generate returns, essentially using money to make more money. In financial terms, it entails buying assets or financial instruments, such as stocks, bonds, or real estate, with the expectation of earning profits or gains over time. AI – Artificial intelligence is providing new opportunities in the domain of finance, especially investment. It is providing investment firms and investors a new opportunity which focusses on taking rational decisions. Investment and portfolio management uses LLM – large language model

for security analysis which helps in exploring its impact and application in investment management.

"With the continuous development of artificial intelligence technology, using machine learning technology to predict market trends is not out of reach. In recent years, artificial intelligence has become a research hotspot in the academic circle, and it has been widely used in image recognition, natural language processing and other fields, and also has a huge impact on the field of quantitative investment. As an investment method to obtain stable returns through data analysis, model construction and program trading, quantitative investment is deeply loved by financial institutions and investors". (Bi. S. et al 2024)

Behavioural finance is undergoing a significant transformation with the integration of Artificial Intelligence (AI) in investment decisions. The financial services industry has witnessed remarkable growth in AI-powered applications. Robo-advisors, in particular, are revolutionizing asset and wealth management, offering a disruptive trend in the industry. Essentially, robo-advisors are automated platforms that utilize algorithms to manage investment portfolios, providing efficient and data-driven financial guidance (Shanmuganathan, M. 2020).

REVIEW OF LITERATURE

A recent study by Kadir et al. (2024) investigated the impact of artificial intelligence (AI) recommendations on individual investor decisions. The findings revealed that individual investors lack sufficient knowledge about AI technologies, yet they are interested in leveraging AI for investment purposes. Furthermore, the study discovered that certain demographics are more sceptical about investing with AI, specifically: Older investors, those with lower education levels, High-income earners and Married individuals. These groups exhibited higher levels of insecurity when considering AI-driven investment opportunities.

Rehman M et al (2024) conducted a study titled "Minds and Machines: Impact of Emotional Intelligence on Investment Decisions with Mediating the Role of Artificial Intelligence". It was found that AI considerably influences depositors' decision-making process with respect to investing; but AI moderately accelerates the connection between emotional intelligence and

investment decisions. The findings proved that AI, particularly in the form of robo-advisors, has power to influence the mitigating force against the behavioral partialities in investing, making the decision sensible and thus reducing the spontaneous decision making. It was also found that ethical consideration and transparency pose a great challenge for the investors.

Chua A et al (2023) conducted a study titled "AI-enabled investment advice: Will users buy it?" The research found that attitude toward AI was positively associated with behavioural intent to accept AI-based recommendations implying that the investors were keen to accept the indications given, trust in AI, and perceived accuracy of AI. Also it was found that the uncertainty level moderated how indications, trust and perceived accuracy varied with behavioural intention to accept AI-based recommendations.

AlAmayreh, E et al (2023) conducted a study titled – "Antecedents of understanding the investors' acceptance of artificial intelligence: Perceptions from Jordanian context in Jordan". The study focussed on the perception of investors towards the factors of Artificial Intelligence (AI) that impacts the behavioural intention of AI adoption. The researchers employed the Technology Acceptance Model (TAM) as the foundation for their study, augmenting it with three additional factors: trust in the service, Trust in the service provider and Training. By incorporating these extra factors, the researchers aimed to gain a more comprehensive understanding of the variables influencing individual investors' acceptance and adoption of artificial intelligence-driven investment services. The researchers selected Jordanian stock market investors with basic investment knowledge were using a convenience sampling method. Trust in the service and subjective norms (social pressure) significantly impacted investors' attitudes toward AI. Investors' attitudes, perceived ease of use, and perceived usefulness of AI were significant predictors of their intention to use AI. Training had a significant impact on investors' perceived ease of use of AI, suggesting that education and training can facilitate adoption. Familiarity with AI technology was found to increase investors' willingness to adopt AI, highlighting the importance of education and awareness. Age is a crucial factor, and it is found that elderly investors may find it difficult to understand and adopt, but young investors may not find it so.

A study by Feher K et al (2023) examined the trends, risks, and potential collaborations in the AI development market from a Hungarian perspective. The exploratory research aimed to identify the broad trends, practical implications, and risks of AI technology in the economy and society. The study found that while AI is seen as a valuable decision-support and problem-solving tool for the economy, it also raises concerns and uncertainties. Building trust and sharing responsibility in cross-industry collaborations are crucial to mitigating these social uncertainties.

OBJECTIVES

- Examine AI's Role in Investment Decisions: Investigate how Artificial Intelligence (AI) is applied in investment decisions.
- Assess AI's Impact on Investments: Analyse the effects of AI on investment outcomes and strategies.
- Evaluate AI's Benefits and Challenges in Investment: Weigh the benefits and weaknesses of using AI in investment decisions.
- Investigate Demographic Factors Influencing AI Familiarity: Examine the relationship between age, gender, occupation, and familiarity with AI in investment.
- Analyse Demographic Factors Shaping Opinions on AI in Investment: Study how age, gender, and occupation influence opinions on the benefits of using AI in investment decisions.

These objectives aim to provide insights into the applications, impacts, benefits, and challenges of AI in investment, as well as the demographic factors that influence familiarity and opinions on AI in investment.

RESEARCH METHODOLOGY

This descriptive study employed a mixed-methods approach to gather data. The researchers have used Secondary data: Research papers from Research Gate and Google Scholar were analysed and Primary data using questionnaire which was administered to 107 respondents in Bengaluru. A comprehensive review of existing literature was conducted. Chi-Square tests were performed using SPSS to identify significant relationships. While this study provides valuable insights into the opinions

of 107 respondents in Bengaluru, its scope is limited to this specific population. The small sample size restricts the generalizability of the findings to a larger population.

Application of AI investment

According to Mercer.com, it has been found that 91% of managers are currently using, 54% are planning to use and 37% use AI within their investment strategy or asset class research. It has also been found that AI analysis just informs but not determines final investment decision. AI has been used in investment or wealth management in the following domains

- Value creation in equities, hedge funds and digital assets.
- Risk mitigation - AI improves risk analysis process by identifying hidden risks and monitoring real-time data, thus minimising the risk.
- Enhanced decision making - AI-driven insights help investment professionals make data-backed decisions and optimize portfolios. This is done through understanding of market trends, identify patterns and correlations which leads to accurate and profitable investment strategies.
- Automating Operational process – The usage of AI in investment management helps in automating operational processes with AI-enabled portfolios that automate allocation, rebalancing, and risk management.
- Better accuracy and Speed - AI algorithms can quickly process and analyse large volumes of historical market data to identify patterns and correlations that may indicate potential risks.
- Real time Monitoring – AI can also help in monitoring real-time market data to identify emerging risks, and market trends and thus provides managers with timely insights and alerts for taking timely and rational decisions.
- Analysis of Financial statements – AI helps in analysing a wide set of data and financial statements which helps in analysing and finding investment opportunities and risks.
- Strategic Activities - AI helps in reducing monotonous and recurring tasks by automating, making available the valuable time for investment professionals so that they can focus on more strategic activities such as research, strategy development, and client engagement.

Impact of AI on investment and Benefits and Challenges of AI

The impact of AI on investment has been manifold. “The use and integration of AI in the investment sector has been found in the assessment, emphasizing how it might improve performance, efficiency, risk management, and the identification of new prospects” as found

out in the study conducted by Taherdoost, H, 2024. The impact of AI on investment could be analysed in the following points

AI impacts the firm value, though it is rarely discussed. It was found that AI-based announcements lead to negative impact on the firms market value. It was found that AI investment announcements were considered unwelcome by investors for majority of the firms (Lui, A. K 2022). AI has impacted the way people have started making investment decisions. AI also helps in forecasting the market reaction following corporate earnings calls using LLM – Large Language models. AI has helped in harnessing Alpha in equity portfolio, measuring the risk exposure of the existing portfolio, though the portfolio managers' role cannot be neglected (Blackrock.com).

The AI has impacted the financial services sector by improving productivity and speeding up the current task, high speed trading in liquid and deepest markets in the world, and analysing the trading patterns (IMF, Sep 2024). AI has also impacted the real estate industry. Though the sector is slow in adoption of AI, but it has helped the real estate sector with faster and accurate analysis and predictions.

Usage of AI has been helpful in identifying, analysing and uncovering patterns based on past data which gives both the investor and firms valuable insights into market behaviour and projections regarding future trends. AI has also been useful in case of Venture capital firms by making their sourcing and screening process more efficient and increasing their portfolio diversity. Most of the firms have not leveraged the usage of AI due to resources constraint, but it is found that the adoption of AI would be considerably higher in the years to come (Rohm S 2022).

AI significantly impacts the investment decisions when it comes to investing. This has been possible by using robo advisors who offer rational advice based on data and avoid bias and also helps in reducing the impulsive decision-making tendencies among investors thus saving them lots of time, energy, and financial resources (Rehman M 2024). AI has also had a significant impact on the due diligence in investment which is basically a process of gathering and analysing information about a company before investing. As the due diligence is comparatively difficult and time consuming, AI models have been of great help in this regard but subject to

the limitations of the secondary data that is available openly and disclosed on the website (Krause D 2023).

Benefits and Challenges of AI on investment

The usage of AI on investment has both benefits and challenges. The benefits for the customers include better access to investment services, more convenient user experience and more affordable advisory service through the usage robo-advisors. However, there are some drawbacks for the customer related to these services, such as lack of personal touch and insufficient assessment of risk tolerance. The benefits for the service provider include cost-efficiency, enlarged customer base, steady income in terms of management fees, better service quality and easier trackability of transactions and procedures. However, service providers also face certain issues with these services like cost of the services, acceptances from the customers, among others (Hakala K. 2019).

AI plays a key role in asset management process and portfolio management as well. AI techniques help in improving the efficiency of investment research, both in actively managed funds and index (passive) investment products and it is also used extensively in ETF-exchange traded funds (Miziolek T 2021). It has been evident that Robo-Advisor 4.0 is a AI enabled platform that offers a full-integrated investment service, including customer profiling, asset allocation, portfolio selection, trade execution, portfolio rebalancing, and tax-loss harvesting according to Deloitte study. Also, it can also provide real decision-taking process for portfolios and financial asset management on behalf of human beings (Sanz Bayon P 2018)

The other benefits of AI in investment includes

- Enhanced decision making as AI helps in analysing the data at a rapid speed and detecting patterns, trends and anomalies with accuracy and precision.
- Reduction in cost as routine tasks get automated and operations gets streamlined thereby reducing the overhead costs for the organisation.
- Improved customer experience through provision of virtual assistants to answer the queries promptly and provide support 24/7.
- Risk management proactively through continuous monitoring of trends, credit risks and others thereby preventing fraudulent activities and protecting and safeguarding the interest of investors and institutions
- Market Analysis and Prediction as AI algorithms help in analysing the market sentiments by studying economic indicators and company performance which in turn helps in making informed decisions, maximising returns and optimising risks.

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In spite of benefits, the application of AI in investment and finance is not free from challenges. A big challenge is data privacy. The AI extracts data which is sensitive and needs to be taken care. There could be algorithm bias potentially leading to prejudiced outcomes. Also there may be challenge in interpreting the decisions due to complexity of the AI models. Ensuring that AI driven investment decisions meet regulatory requirements is yet another challenge.

There could also be operational challenges like incorporating and integrating with systems and process, handling large datasets and computational complexities. Ensuring AI based decisions are fair and free from bias is also a major challenge. Cost and resource intensity also poses a big challenge. Skill set i.e., acquiring and retaining workforce specialised in AI is a tough job. Also there is a misconception that AI interference will disrupt the human jobs, changing this mindset among the workforce is a major concern. The AI models need to be continuously updated to adapt to the changing market conditions.

Results and Discussion

The researchers collected data from 107 respondents and analysed using Chi-Square test.

Null Hypothesis H01**:** There is no significant link between Gender and familiarity with AI in investment.

Alternative Hypothesis H11**:** There is a significant link between Gender and familiarity with AI in investment.

Chi-Square Test

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.009[a]	4	.908
Likelihood Ratio	1.022	4	.906
Linear-by-Linear Association	.206	1	.650
N of Valid Cases	107		

As the p value is 0.908 which is more than the .05, Accept null hypothesis and it is concluded that there is no significance difference between gender and familiarity with AI in investment.

Null Hypothesis H02**:** There is no significant link between Age and familiarity with AI in investment.

Alternative Hypothesis H12: There is a significant link between Age and familiarity with AI in investment.

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Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.827[a]	12	.199
Likelihood Ratio	16.806	12	.157
Linear-by-Linear Association	3.412	1	.065
N of Valid Cases	107		

The p value is 0.199 which is more than the Alpha value of .05, Accept null hypothesis and it is concluded that there is no significance difference between Age and familiarity with AI in investment.

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Null Hypothesis H03: There is no significant association occupation and familiarity with AI in investment.

Alternative Hypothesis H13: There is a significant association between occupation and familiarity with AI in investment.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.788[a]	12	.871
Likelihood Ratio	7.072	12	.853
Linear-by-Linear Association	.053	1	.819
N of Valid Cases	107		

The p value is 0.871 which is more than the Alpha value of .05, Accept null hypothesis and it is concluded that there is no significance difference between occupation and familiarity with AI in investment

Null Hypothesis H04: There is no significant association between gender and opinion about usage of AI in investment is beneficial

Alternative Hypothesis H14: There is a significant association between gender and opinion about usage of AI in investment is beneficial

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.014[a]	4	.733
Likelihood Ratio	2.356	4	.671
Linear-by-Linear Association	.008	1	.929
N of Valid Cases	106		

The p value is 0.733 which is more than the Alpha value of .05, Accept null hypothesis and it is concluded that there is no significance difference between gender and opinion about usage of AI in investment is beneficial to the investors.

Null Hypothesis H05: There is no significant association between age and opinion about usage of AI in investment is beneficial

Alternative Hypothesis H15: There is a significant association between age and opinion about usage of AI in investment is beneficial

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.361[a]	12	.175
Likelihood Ratio	14.289	12	.283
Linear-by-Linear Association	1.643	1	.200
N of Valid Cases	106		

The p value is 0.175 which is greater than the Alpha value of 0.05, Accept null hypothesis and it is concluded that there is no significance difference between age and opinion about usage of AI in investment is beneficial to the investors.

Null Hypothesis H06: There is no significant association between occupation and opinion about usage of AI in investment is beneficial

Alternative Hypothesis H16: There is a significant association between Occupation and opinion about usage of AI in investment is beneficial

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Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.327[a]	12	.420
Likelihood Ratio	12.287	12	.423
Linear-by-Linear Association	.078	1	.781
N of Valid Cases	106		

The p value is 0.420 which is greater than the Alpha value of 0.05, Accept null hypothesis and it is concluded that there is no significance difference between occupation and opinion about usage of AI in investment is beneficial to the investors.

Findings

The findings of the study are as under

- 58.9% are male respondents and 57% belong to the age group of 21-30 years
- Majority of the respondents 41.1% belong to Private sector.
- 8.4% of the respondents are very familiar and 29% are familiar with the concept of AI in investment
- 66.4% of the respondents use AI while investing.
- 16% strongly agree and 44% agree about the opinion that AI-powered investment advice could be useful.
- It is found that there is no significance difference between gender, age and occupation and familiarity with AI in investment.
- It is found that there is no significance difference between gender, age and occupation and opinion about usage of AI in investment is beneficial to the investors.

Conclusion

This study provides valuable insights into the effectiveness of Artificial Intelligence (AI) in investment decisions, highlighting both benefits and challenges. The findings suggest that AI-driven investment strategies offer improved portfolio performance, enhanced risk management, and increased efficiency. However, challenges related to data quality, algorithmic bias, and regulatory uncertainty persist. Demographic analysis reveals no significant difference between age, gender, and occupation and familiarity with AI in investment. Education and awareness campaigns can bridge knowledge gaps and foster adoption. The Implications are that Investment firms should prioritize AI adoption to remain competitive, regulatory bodies must establish clear guidelines for AI-driven investment, Investors should consider AI-powered tools to enhance decision-making and education, and training programs should focus on AI literacy and demographic inclusivity.

Future Directions

This study provides a foundational understanding of opinion of respondent's investment patterns and perception of investors using AI in Bengaluru. Future research could explore Comparative analysis with other Indian cities, in-depth examination of AI-driven investment decision-making processes and assessment of AI's impact on investment outcomes and portfolio performance.

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