An Economic Analysis of Utilising Robo Advisors in Investment Management

DR. RAGHU C
Assistant Professor, Department of Economics, Government first Grade College, HSR Layout, Bangalore.

Abstract*— A robo-advisor, is a digital platform that provides automated, algorithm-driven financial planning and investment services with little or no human supervision. A typical robo-advisor asks questions about the investors' financial situation and future goals through an online survey. It then uses the data to offer advice and automatically invest for him or her. Other common designations for robo-advisors include "automated investment advisor," "automated investment management," and "digital advice platforms." The best robo-advisors offer easy account setup, robust goal planning, account services and portfolio management. Additionally, they offer security features, comprehensive education and low fees. The study "An economic analysis of robo advisors in investment management" explores the role and effectiveness of robo-advisors in investment management. The research project aims to evaluate the ease of use, transparency and customization options of robo-advisors, their risk management effectiveness, cost-benefit analysis, and adaptability and innovation. The mixed-method approach combines quantitative and qualitative assessments to provide a comprehensive evaluation. Key findings include the ease of use, risk management, cost-effectiveness and adaptability of robo-advisors. The findings have implications for investors, financial institutions, and policymakers. Investors can benefit from robo-advisors if they align with their investment goals and risk tolerance. Traditional financial institutions can leverage robo-advisor technology to enhance their service offerings and attract a broader customer base. Policymakers need to monitor the evolving landscape of robo-advisors to ensure investor protection, transparency and compliance with regulatory standards. The study contributes valuable insights to the ongoing discourse surrounding the role of technology in reshaping the financial services industry.

Index Terms- Robo advisors, Investment Management, Risk management, Financial institutions

I. INTRODUCTION

Online investment management firms known as "robo-advisors" use mathematical algorithms to give financial advice with little to no human involvement. They manage and distribute client assets as efficiently as possible by using their algorithms. Robo-advisors employ online surveys to get data on their clients' financial situation, desired rate of return on investment and level of risk aversion. The rise of robo-advisors in investment management has revolutionized the financial landscape, offering a mix of automation and algorithmic finesse. These digital platforms promise democratized access to wealth creation for the masses, but the question remains: how effective are robo-advisors in navigating the turbulent waters of financial markets and delivering optimal returns for their clients? This research endeavor aims to unravel the fabric of these automated advisors, understand their strengths and weaknesses, and assess their genuine effectiveness in achieving desired investment outcomes.

The first robo-advisors, Betterment and Wealthfront, launched in 2008. Wealthfront began as a mutual fund company. It planned to assist the tech community, then realized that computer software could make investment advice more accessible. Betterment, began with the initial purpose of rebalancing assets within target-date funds (TDFs). It sought to help manage passive, buy-and-hold investments through a simple online interface. The technology was nothing new. Human wealth managers have been using automated portfolio allocation software since the early 2000s. But until Betterment and Wealthfront launched, wealth managers were the only ones who could buy the technology, so clients had to employ a financial advisor to benefit from the innovation. Today, most robo-advisors use passive indexing

strategies that are optimized using some variant of modern portfolio theory (MPT). They also can handle much more sophisticated tasks, such as tax-loss harvesting, investment selection, and retirement planning.

Robo-advisors operate with the cold precision of algorithms, derived from modern portfolio theory (MPT), a rigorous framework that emphasizes risk-return optimization through meticulous asset allocation. They employ transparent algorithms tailored to individual risk profiles gleaned from questionnaires and financial data analysis, promising consistency and objectivity, potentially minimizing the impact of human biases and emotional impulses that can plague traditional investment decisions. However, the allure of automation does not absolve us from the duty of critical interrogation. We must delve deeper, scrutinizing the efficacy of MPT within the context of these algorithmic stewards, ensuring their portfolios adhere to the efficient frontier, perform against established benchmark indices and cater to the diverse needs and risk appetites of a heterogeneous investor landscape. The very essence of financial management hinges on a delicate balance of trust between client and advisor. In the case of robo-advisors, this trust rests on the transparency of their algorithms, the clarity of their investment decisions and the ethical alignment of their interests with those of their clients. Evaluating mechanisms in place to ensure transparency and mitigate potential conflicts of interest is paramount to cultivating and sustaining trust in this nascent landscape.

The amount that investors are ready to forgo their higher earnings in order to minimize uncertainty is known as their degree of risk aversion. For an individual, it often varies according on the investment's time horizon and financial objectives. Someone who is nearing retirement age, for instance, would be more inclined to invest in risk-averse products since they cannot afford to lose their whole life savings. Younger investors, however, could be more willing to take on risk since they have more time to make up lost money.

Varieties of Investors: On the basis of their risk taking abilities, investors could be categorised as:

a) Risk Averters: These investors often seek for safe assets, even if their returns may be comparatively lower.
b) Neutral on risk: Risk-neutral investors do not really care, which assets are safe or relatively hazardous.
c) Risk Lovers: These investors typically gravitate toward riskier ventures with larger potential returns.

Qualities of Virtual Advisors
Robo-advisors use the investor's choices to build the best possible portfolios. Funds are often divided between risky and risk-free assets by robo-advisors, with weights determined by the investor's risk tolerance and goals. Robo-advisors keep an eye on the portfolio and modify the weights of risky and risk-free assets when the economy shifts.

Harvesting taxes losses: Selling stocks at a loss to reduce capital gains tax is known as "tax-loss harvesting," and it usually takes place around towards the end of the tax year. Investors can defer paying taxes on revenue by selling a security at a loss. To preserve portfolio allocation and profit from a market rebound, it's crucial to make an investment in a comparable securities at the same time. Robo-advisors automate the process, allowing consumers to profit from tax-loss harvesting simply.

Traditional investment management services are provided by robot advisors at a far cheaper cost than by their human counterparts, financial advisers. Additionally, the minimal amount needed to utilize this kind of software is far less than what financial advisers need.

Additionally, robo-advisors bring value by making it easy for investors to make investments across a wide range of asset classes via online apps or mobile devices. Additionally, they give consumers complete access to portfolio management tools, which give them greater security and flexibility.

Comparison between Human advisors v/s robot advisors
Human advisors bring the personal touch to financial planning by understanding the unique financial situation, goals, anxieties, and risk tolerance. They can tailor investment strategies that match the investors' specific circumstances, offering personalized

strategies, emotional support, a holistic approach, and flexibility. However, they typically charge higher fees, have limited availability, and may be subject to personal biases and market trends.

Robo-advisors leverage modern technology to automate investment management, offering lower minimum investment requirements and fees, convenience, efficiency, objectivity, diversification and scalability. They provide a user-friendly online platform for managing investments, offering 24/7 access and automated portfolio management. However, they lack the personalized understanding and emotional support human advisors offer, leaving some investors feeling disconnected from their financial journey. These robo-advisors may not be suitable for highly complex financial situations requiring specific asset selection or estate planning expertise. They are also technology dependent, with system outages or technical glitches disrupting access and potentially delaying investment adjustments. Additionally, the automated nature leaves less room for individual choices and customization compared to human advisors.

Credibility factors with Robo-Advisors:
Robo-advisors are a new type of investment advisor that offer efficient, low-cost, and convenient portfolio management. However, the question of safety surrounding these platforms arises as investment always carries inherent risks. To assess their safety, consider three key aspects: security and data protection, algorithmic transparency and bias, and risk management and oversight.

Robo-advisors collect and store sensitive financial data, making them prime targets for cyber attacks. To assess their safety, consider cyber security measures, data privacy policy, regulatory compliance, algorithmic transparency, bias and risk management and oversight. Factors contributing to the overall safety of robo-advisors include regulation, financial stability, technology advancements and transparency initiatives. To make informed choices when evaluating the safety of a robo-advisor, research the platform's security measures and regulatory compliance, investigate their data privacy policy, ask about algorithmic logic and potential biases, inquire about risk management strategies and rebalancing procedures, compare fee structures and minimum investment requirements, and seek independent reviews and expert opinions.

Beyond robo-advisors, traditional human advisors may still be a preferred option for complex financial situations or personalized advice. Hybrid models combining the automation of robo-advisors with the human touch of professional guidance are emerging, offering a potentially effective blend of safety and customization. Ultimately, the safety of investments lies in making informed choices, actively managing portfolio and understanding the inherent risks involved. Prioritize careful research, comprehensive due diligence and ongoing engagement with financial strategy.

II. REVIEW OF LITERATURE

Jonathan Walter Lam (2016): In his article "Robo-advisors: A portfolio management perspective", asserts that, financial advice is crucial for risk-taking, especially for those with limited knowledge or experience in financial markets. Robo-advisors, automated investment platforms, offer advice without human intervention, helping individuals overcome fears and act rationally. This paper examines the robo-advisor model, focusing on its benefits and limitations. The primary asset allocation framework used by robo-advisors is mean-variance analysis, which allows investors to construct efficiently diversified portfolios. Although the model has limitations, such as the assumption of normally distributed returns and the sensitivity of optimized portfolios to estimation error, these can be overcome through straightforward techniques. This paper may enable individuals to use computer models to obtain sound investment advice.

Kokfai Phoon, Francis Koh (2017), in their article "Robo Advisors and Wealth Management" published in the journal of alternative investment opines that the recent rise of robo-advisors (RAs) has threatened the traditional fund and wealth management industry. RAs' assets under management (AUM) have risen many fold through competitiveness on pricing, transparency and services and better expected returns linked to the use of quantitative finance and technology with less subjective human intervention. This article examines the postulation that RAs have an

edge over traditional wealth managers. RAs can combine the judgement and computing resources of both human and machine or bionic power, to provide alternative wealth management services to meet the diverse needs of private wealth clients. However, the authors expect traditional wealth managers to respond by providing new and improved customized and integrated services at competitive fees.

Manchuna Shanmuganathan (2018) in his article "Behavioural finance in an era of artificial intelligence: Longitudinal case study of robo advisors in investment decisions" specifies the implications of artificial intelligence (AI) applications in behavioural finance and their technical issues. The growth of AI-based applications in the financial services industry, particularly in behavioural finance, has led to the development of robo-advising algorithms. These algorithms, based on a theoretical framework, produce reliable portfolios based on investors' behaviour, making them a disruptive trend in asset and wealth management. Robo-advisors are automated investment platforms that use quantitative algorithms to manage investors' portfolios and are easily accessible to customers online. The paper provides a longitudinal case study on robo-advisors and behavioural financial decision-making processes by investors, emphasizing the importance of these decisions for successful execution of a customer's financial portfolios.

Valdone Darskuviene, Nomeda Lisauskiene (2018), In their article named "Linking the robo advisors phenomenon and behavioural biases in investment management: An interdisciplinary literature review and research agenda", examines the relationship between Robo-advisors and individual investors' behavioral biases. It uses a qualitative investigation method to examine the impact of Robo-advisors on behavioural biases. The findings suggest that Robo-advisors can help users make more informed decisions, but they can also activate investors' automatic system processes, potentially alienating them from the stock market and reducing their understanding of the investment process. The paper contributes to the literature by arguing for a dual process theoretical framework, studying the Robo-advisor phenomenon, and suggesting drivers of the effect on behavioral biases as a future research direction. The study also suggests a comprehensive definition of Robo-advisors.

III. THEORITICAL BACKGROUND OF THE STUDY

The evolution of robo-advisors in investment management has been a fascinating journey marked by technological advancements, changing consumer preferences and the ever-evolving financial landscape. In the early 2000s, traditional investment management dominated the market, characterized by human advisors providing personalized advice to clients. However, as technology continued to advance, the financial industry witnessed a paradigm shift with the emergence of robo-advisors. The first generation of robo-advisors, which surfaced around the mid-2000s, primarily focused on automating asset allocation through algorithms. These platforms aimed to provide cost-effective investment solutions by minimizing human intervention. The algorithms were designed to analyze clients' risk tolerance, financial goals and market conditions to create diversified portfolios. While these early robo-advisors gained attention for their simplicity and accessibility, they lacked the depth of personalized advice that traditional human advisors could offer. As the financial industry progressed, the second wave of robo-advisors emerged in the late 2000's and early 2010's. This generation marked a significant enhancement in terms of features and sophistication. Robo-advisors began incorporating machine learning and artificial intelligence to improve their ability to analyze vast amounts of financial data swiftly. This allowed for more nuanced portfolio construction, taking into account not only traditional factors like risk tolerance but also dynamic market conditions and economic indicators.

During this period, the industry experienced an influx of new entrants, including both standalone robo-advisor firms and traditional financial institutions incorporating robo-advisory services into their existing offerings. The competition spurred innovation, resulting in improved user interfaces, better customer experiences, and a broader range of investment options.

One notable trend in the evolution of robo-advisors was the integration of socially responsible investing

(SRI) and environmental, social, and governance (ESG) criteria. Investors became more conscious of the impact of their investments on the world, and robo-advisors responded by offering portfolios aligned with ethical and sustainable principles. This not only expanded the appeal of robo-advisors to a broader audience but also showcased their adaptability to evolving societal values. In the mid-2010's, the industry witnessed the convergence of robo-advisors with other financial technologies (fintech), such as block chain and crypto currency. Some robo-advisors started incorporating digital assets into their investment strategies, providing clients with exposure to a new and volatile asset class. This move, while adding diversity to investment options, also brought forth new challenges related to regulatory compliance and risk management.

Regulatory frameworks around robo-advisory services also evolved during this period. Authorities recognized the need to establish guidelines to ensure investor protection, transparency and the responsible use of technology in financial advisory services. Regulatory developments aimed to strike a balance between fostering innovation and safeguarding the interests of investors, thereby contributing to the maturation of the robo-advisory industry.

The latter half of the 2010s saw the rise of hybrid models, combining the strengths of robo-advisors with human advisors. This approach aimed to address the limitations of fully automated services by providing clients with the option to consult a human advisor when needed. Hybrid models sought to achieve a balance between the efficiency of algorithms and the personalized touch of human interaction, offering clients a comprehensive and tailored advisory experience.

Robo-advisors continued to evolve in response to shifting market dynamics and technological advancements. The integration of advanced analytics, natural language processing, and behavioral finance principles further enhanced the capabilities of robo-advisory platforms. These advancements allowed for more sophisticated client profiling, personalized communication, and real-time adjustments to investment strategies based on changing market conditions. Looking ahead, the future of robo-advisors in investment management appears promising. The ongoing development of artificial intelligence, machine learning, and quantum computing may open new frontiers for robo-advisors, enabling them to navigate increasingly complex financial markets with greater precision. However, challenges such as cyber security risks, data privacy concerns, and the need for continued regulatory adaptation will remain critical considerations for the industry.

IV. OBJECTIVES OF THE STUDY

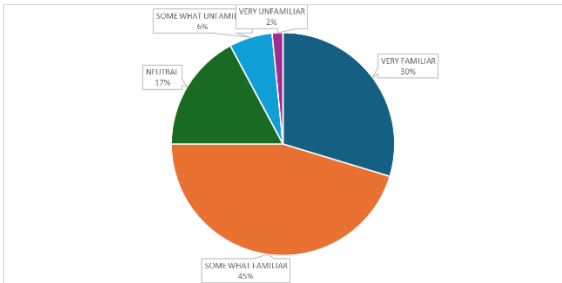
- To understand the use of Robo advisers for managing investment decisions.
- To evaluates ease of use, transparency and customization options.
- To assesses risk management effectiveness in different market conditions.
- To conducts an economic analysis of cost-benefit analysis of fees v/s traditional services.
- To offer suggestions for better adoptability of Robo advisers in making investment decisions.

V. SCOPE OF THE STUDY

The purpose of this study is to assess how well robo-advisors perform in terms of producing desired investment results. It examines how well robo-advisors apply MPT principles, get past cognitive biases, meet the needs of a variety of investors, reduce tax obligations and foster trust through transparent communication. It focuses on risk-adjusted return, behavioral influences, platform diversity, tax optimization, and transparency. It aims to provide light on the genuine potential of robo-advisors in democratizing wealth management through surveys, empirical testing, and platform comparisons.

Data Analysis:

CURRENT FAMILIARITY LEVEL OF ROBO-ADVISORS



USAGE OF ROBO-ADVISORS

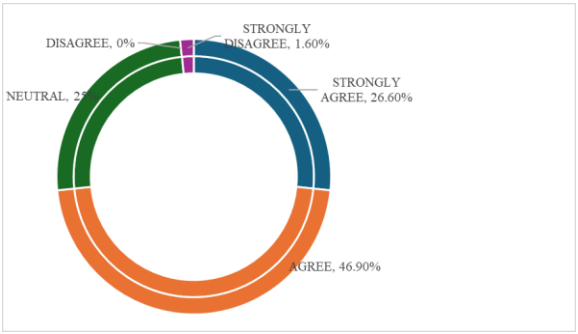
OPINION	NO. OF RESPONDENTS
DAILY	19
WEEKLY	29
MONTHLY	11
OCCASIONALLY	4
NEVER	1

FACTORS INFLUENCING THE DECISION TO CHOSE ROBO-ADVISORS

OPINION	NO. OF RESPONDENTS
LOW FEES	31
PERFORMANCE TRACK RECORD	31
TRUST IN TECHNOLOGY	39
USER FRIENDLY INTERFACE	35
PERSONALIZED INVESTMENT STRATEGIES	26

The results reveal that low fees, performance track record, trust in technology, and ease of use are key factors influencing individuals' decisions to adopt robo-advisors for investment management. Low fees are a significant consideration, with 48.4% of respondents citing this as a determinant factor. Performance track record is also highly valued, with 57.8% valuing past results and the desire for assurance of satisfactory returns. Trust in technology is crucial, with 60.9% emphasizing its significance. A user-friendly interface is highly valued, with 54.7% prioritizing intuitive design and ease of use. Personalized investment strategies are cited by fewer respondents (40.6%), suggesting that while customization is appreciated, it may not be the primary driver for all investors. Overall, factors such as cost, performance, trust in technology, and ease of use play pivotal roles in shaping individuals' decisions regarding robo-advisor adoption.

POSITIVE RETURNS ON INVESTMENT USING ROBO-ADVISORS



The data indicates that a majority of investors believe robo-advisors consider ethical or socially responsible investment options to some extent. However, few respondents remain undecided or skeptical, with only a small number of investors believing robo-advisors rarely consider socially responsible investment options and none believing they never do. This suggests that investors recognize robo-advisors' partial responsiveness to ethical or socially responsible investment concerns.

The results show that generally a positive attitude on robo-advisors for investing purposes. The majority, 79.7%, who answered "Definitely" and "Probably," are confident in recommending them. This shows that respondents are very satisfied or trusting of robo-advisors' competence. The absence of those who would "Definitely Not" suggest them is noteworthy, implying a lack of significant negative opinion. However, it is worthwhile to investigate the reasons for the indifferent replies and the minority that are apprehensive. Overall, the data indicate that robo-advisors are perceived positively as a realistic choice for investment management.

VI. FINDINGS

- Transparency emerged as a key strength, with robo-advisors providing clear insights into investment strategies and fees.

- Customization options were found to vary among platforms, influencing user satisfaction and investment outcomes.
- Robo-advisors demonstrated varying degrees of effectiveness in managing risk across different market conditions.
- In volatile markets, robo-advisors showed resilience in adjusting investment portfolios to mitigate risks.
- The cost-benefit analysis revealed that robo-advisors offer competitive fee structures compared to traditional investment services.
- Continuous technological advancements were seen to enhance the functionality and performance of robo-advisors.
- Users expressed confidence in the ability of robo-advisors to adapt to evolving market dynamics.
- The study highlighted the importance of regulatory compliance in ensuring investor protection and trust in robo-advisory services.
- Overall, robo-advisors were perceived as valuable tools for both novice and experienced investors.
- User feedback emphasized the need for ongoing improvements in user interface and educational resources.
- The findings suggest a promising future for robo-advisors as integral components of modern investment management strategies.

VII. SUGGESTIONS

- Evaluate user experience by incorporating feedback on ease of use, transparency, and customization options of robo-advisors.
- Analyze the effectiveness of robo-advisors in managing risks across various market conditions to provide insights into their risk management capabilities.
- Conduct a cost-benefit analysis comparing fees associated with robo-advisors to those of traditional investment services to determine their financial advantages.
- Investigate the adaptability and innovation of robo-advisors in response to evolving market dynamics and technological advancements.
- Gather data on user satisfaction and performance metrics to assess the overall effectiveness of robo-advisors in investment management.
- Explore the potential challenges and limitations faced by users when utilizing robo-advisors for investment purposes.
- Recommend strategies for optimizing the utilization of robo-advisors based on the findings to enhance their role in investment management practices.

CONCLUSION

Robo-advisors have been found to be a valuable tool for modern investment management, offering a user-friendly, transparent, and cost-effective approach to wealth creation. They excel in ease of use, transparency, customization, risk management, cost efficiency, and adaptability. Robo-advisors provide clear communication regarding investment strategies, fees, and performance, empowering investors to make informed decisions. They also allow for customization based on individual risk tolerance and financial goals, catering to a wider range of investors. Compared to traditional financial advisors, robo-advisors generally charge lower fees, making them cost-effective for smaller portfolios or those seeking a more automated approach. However, for complex financial situations or those requiring personalized advice, traditional advisors may still be preferred.

REFERENCES

[1] Robo-advisors: A portfolio management perspective. Jonathan Walter Lam - *Senior thesis, Yale College 20, 2016*

[2] Robo-advisors and wealth management. Kokfai Phoon, Francis Koh – *The Journal of Alternative Investments 20 (3), 79-94, 2017*

[3] Behavioural finance in an era of artificial intelligence: Longitudinal case study of robo-advisors in investment decisions. Manchuna Shanmuganathan – *Journal of Behavioral and Experimental Finance 27, 100297, 2018*

[4] Robo-advisors as a form of artificial intelligence in private customers' investment advisory services. Hakala, Krista

[5] The effect of humanizing robo-advisors on investor judgments. Frank D Hodge, Kim I Mendoza, Roshan K Sinha – *Contemporary Accounting Research 38 (1), 770-792, 2018*

WEBSITES LINKS
Google Scholar – https://scholar.google.com/
Research Gate – https://www.researchgate.net/
Wikipedia – https://www.wikipedia.org/
Investopedia – https://www.investopedia.com/