ADOPTION INTENTION FACTORS OF ROBO-ADVISORY INVESTMENT

Suhaily Maizan Abdul Manaf[1*], Md Khairu Amin Ismail[2], Shahsuzan Zakaria[3]

[1] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Terengganu, Malaysia
    Email: suhailymaizan@uitm.edu.my
[2] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Kelantan, Malaysia
    Email: mkai01@uitm.edu.my
[3] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Selangor, Malaysia
    Email: shah81@uitm.edu.my
*   Corresponding Author

Article Info:

Abstract:

Participation in various financial instruments is crucial for financial engagement and wealth creation. However, lower investment adoption intention and participation levels, especially in robo-advisory instruments, need to be discussed further. Understanding the determinants of adoption intention on robo-advisors is essential for developing effective investment decision-making, thus promoting financial literacy and investment behavior. Thus, this qualitative study aims to identify the adoption intention factors of robo-advisory investment. The researcher analyzed 28 indexed journal articles using NVivo. The result highlighted that financial literacy, perceived risk, and perceived trust are the most dominant factors derived from the analysis. By shedding light on the factors influencing adoption intention, the research informs the development of more effective interventions and policies to encourage individuals to invest in their financial future.

Keywords:

Adoption, Intention, Robo-Advisor, NVivo.

Introduction

Investing has become a critical tool for ensuring the financial security of individuals in today's fast-paced society. It is a crucial financial strategy for guaranteeing enough cash flows between deficit- and surplus-expenditure units. Financial stability, emergency preparedness, achieving

financial goals, wealth creation, and battling inflation are just a few benefits of investing. Furthermore, investing will contribute to the nation's economic growth and financial stability (Khoo et al., 2024; Roh et al., 2023).

One current digital trend in the financial industry and one of the most recent innovations to emerge in the wealth-management business is robo-advisory service. The term robo-adviser consists of the words 'robot' and 'advisor', representing an artificial intelligence (AI) system for wealth management (Nain & Rajan, 2023). According to Nourallah (2023), robo-advisory is an online portfolio-management solution that aims to invest in client assets by automating client-advisory services. They can systematize financial-planning by utilizing algorithm-driven software, and consequently, substantially less engagement with others is required. Several years ago, robo-advisors were developed as a source of investment advice for individual investors who were comfortable receiving assistance via the Internet without interacting with human advisers (Isaia & Oggero, 2022).

The use of innovation of a portfolio-investment adviser by prospective clients is a technology-based service that evaluates the customers' profiles via a preliminary assessment that consists of questions about the clients' potential risk-and-return objectives. It then makes precise recommendations or actions for investment or portfolio-rebalancing, like what a human or traditional financial adviser would do, but autonomously and based on artificial intelligence (Belanche et al., 2019). In this regard, the robo-advisors have increasingly acquired legitimacy as alternative tools for millennials interested in investing in portfolio assets. Investors, particularly younger and more technologically adept investors, have potentially seen robo-advising as a credible and cost-effective way to acquire investment advice (Chandani et al., 2021).

The objective of this study is to identify the factors regarding the adoption intention of robo-advisory investment due to the growing need for long-term investments that rely on steady asset management to generate returns. Given this context, it is essential to analyze the preceding elements that contribute to the use of robo-advisor consumers. This study proposes certain factors on the adoption intention of robo-advisors by applying NVivo software.

Problem Statement

The advent of fintech and AI-powered applications has brought forth fresh prospects for financial management. Nevertheless, there is a dearth of extensive investigation into the adoption and behavioral patterns associated with robo-advisors (Ashrafi, 2023; Roh et al., 2023), as well as insufficient financial knowledge regarding robo-advisory services (Belanche et al., 2019). This poses a significant challenge for consumers, potentially hindering their ability to make informed financial decisions that can greatly impact their overall well-being. Despite the purported benefits of robo-advising, its adoption has not increased as shown by Chandani et al. (2021), Isaia and Oggero (2022), and Jung et al. (2018). Furthermore, Bhatia et al. (2021) addressed the widespread use of information technology in financial markets, however, the adoption of robo-advisors remained limited. Thus, the low adoption of the robo-advisors needs further investigation. In other words, there is still space to investigate the need to elevate behavioral intention on the use of the robo-advisory. Adopting the new platform in portfolio-investing is a crucial part to be discussed further.

Research Questions

RQ1. What are the adoption intention factors of robo-advisors?

RQ2. What age range is the most adopting robo-advisors as their alternative investment?

Literature Review

Robo-advisors are online platforms that employ algorithms to provide consumers with investment advice and oversee their investment portfolios (Bhatia et al., 2021). Robo-advisors are a prevalent form of automated service in this domain. They employ machine learning and algorithms to evaluate a client's risk tolerance and oversee their assets. Investors who lack the time or expertise to personally invest their money may find them beneficial. To utilize robo-advisors, individuals must fill out a set of standardized online questions regarding their financial goals and tolerance for risk. This helps to streamline the process of getting started with the robo-advisory service.

The emergence of robo-advisors has triggered fierce competition, resulting in a reduction in fees and forcing traditional financial institutions to reassess their cost structures or integrate robo-advisory platforms to remain competitive (Fan & Chatterjee, 2020). Robo-advisors have been increasingly popular in Malaysia as more customers are turning to digital financial management solutions (Ku & Wang, 2022; Sani & Koesrindartoto, 2019). The primary aim in Malaysia is to enhance the financial literacy of the robo-advisors program, particularly for potential investors who are actively seeking high-income investments and choose user-friendly and system-oriented platforms. The emergence of robo-advisory services as a digital investment option has had a significant impact on the business, financial markets, and investment systems in Malaysia. Robo-advisors offer a faster and more secure alternative to traditional advising services. They utilize contactless connectivity and have lower consultation fees (Abraham et al., 2019). Robo-advisory adoption has the potential to revolutionize the financial advisor industry, leading to increased contribution to the nation's income, enhanced local and global competitiveness, and ultimately fostering the growth of Malaysia's digital economy.

Methodology

This qualitative study seeks to investigate the most significant factors of financial literacy, perceived risk, and perceived trust in the behavioral adoption of robo-advisors, based on the provided background and problem statement. The process involved choosing a total of 28 journal articles retrieved from Scopus and Web of Sciences databases, and in English language. The suggested articles undergo a screening process where the criteria for article selection are determined. The criteria encompass the following dimensions: timeline, publication type, language, and subject area. Given the vast number of published articles, it is exceedingly difficult for researchers to comprehensively review all of them. Consequently, Okoli (2015) proposed that researchers should establish a specific time frame within which to conduct their literature review. The period from 2019 to 2023 was selected as a designated timeline, encompassing a duration of five years. All selected journal articles are then uploaded into NVivo, and data analysis methods are applied from there. The NVivo12 Plus software application was utilised for coding and thematic identification purposes.

Table 1: Selected Articles for this Study

No.	Author(s) and Year	No.	Author(s) and Year
1.	Bruckes et al. (2019)	15.	Kraiwanit et al. (2022)
2.	Hohenberger et al. (2019)	16.	Oehler et al. (2022)
3.	Sani & Koesrindartoto (2019)	17.	Isaia & Oggero (2022)
4.	Belanche et al. (2019)	18.	Bhatia et al. (2022)
5.	Bhatia et al. (2020)	19.	Yeh et al. (2022)
6.	Fan & Chatterjee (2020)	20.	Ku & Wang (2022)
7.	Shanmuganathan (2020)	21.	Rachman & Sukmadilaga (2022)
8.	Tan (2020)	22.	Ashrafi (2023)
9.	Bhatia et al. (2021)	23.	Nguyen et al. (2023)
10.	Gerlach & Lutz (2021)	24.	Eren (2023)
11.	Wu & Gau (2021)	25.	Nourallah et al. (2023)
12.	Atwal & Bryson (2021)	26.	Nourallah (2023)
13.	Seiler et al. (2021)	27.	Roh et al. (2023)
14.	Flavian et al. (2022)	28.	Yi et al. (2023)

Analysis

A word frequency analysis method was employed to conduct text analysis on a collection of terms or concepts that exhibit the highest frequency concerning ethical practices. This approach allows for the identification of underlying themes through the process of coding. The size of the words in the word frequency results influenced the frequency of occurrence for certain words relative to others. Put simply, there is a positive correlation between the size of a word and its frequency of occurrence. Figure 1 shows the word frequency for this study.

Figure 1: Word Frequency

Source: Results from NVivo software

Word	Length	Count	Weighted Percentage (%)
trust	5	559	12.19
robo	4	104	2.27
advisors	8	73	1.59
use	3	63	1.37
risk	4	51	1.11
financial	9	50	1.09
perceived	9	50	1.09
technology	10	48	1.05
intention	9	29	0.63
social	6	29	0.63
service	7	26	0.57
advisor	7	25	0.55

Figure 2: Summary of Word Frequency

Source: Results from NVivo software

Figure 2 above presents a summary of the frequently occurring words found in all the journal articles utilised in this study. The table provides insights into various perspectives, including the appropriateness of the chosen papers and the central ideas discussed within them. The observed result aligns with the main objective of this research, thereby aiding the researcher in accomplishing the stated goals.

Open coding can be identified if those journal papers are relevant to this study's main purpose. Axial coding helped the researcher gain a deeper grasp of the topic and find patterns and themes that weren't immediately apparent. Figure 3 shows adoption intention elements based on article analysis. The researcher found other key areas for future research. Even though it is not the study's goal, the researcher cannot ignore it.

To highlight the findings, Figure 4 below shows the methodology, respondents, and underpinning hypotheses. The researcher found themes in this coding, which answered the research questions and objectives.

Codes				
⊕ Name	^ ≡	Files	References	Created on
⊟ O Adoption Factors		28	613	6/3/2023 12:32 PM
O Affective reactions		1	1	6/10/2023 12:10 PM
O Attitude		6	6	6/7/2023 5:01 PM
O Awareness		3	3	6/7/2023 9:58 PM
O Behavioral biases		1	1	6/10/2023 12:13 PM
O Cost effectiveness		3	3	6/3/2023 2:25 PM
O Effort expectancy		3	3	6/9/2023 10:31 AM
O Facilitating conditions		2	2	6/9/2023 10:59 AM
O Financial experience		2	3	6/10/2023 12:17 PM
O Knowledge or Literacy		6	6	6/9/2023 9:33 AM
O Perceived benefit		1	1	6/7/2023 10:06 PM
O Perceived ease of use		5	5	6/3/2023 2:24 PM
O Perceived Risk		8	9	6/3/2023 12:33 PM
O Perceived security		2	2	6/7/2023 9:53 PM
O Perceived usability		1	1	6/9/2023 9:33 AM
O Perceived usefulness		4	4	6/8/2023 10:10 PM
O Performance expectancy		2	2	6/9/2023 10:59 AM
O Relative advantage		1	1	6/9/2023 10:30 AM
O Self-enhancement		1	1	6/10/2023 12:14 PM

Codes				
⊕ Name	^ ≡	Files	References	Created on
O Relative advantage		1	1	6/9/2023 10:30 AM
O Self-enhancement		1	1	6/10/2023 12:14 PM
O Social Influence		5	5	6/8/2023 9:39 AM
O Structural Assurance		1	2	6/3/2023 12:33 PM
O Subjetive norms		1	1	6/10/2023 12:16 PM
O Technology readiness		1	1	6/8/2023 10:45 PM
O Trust		25	550	6/10/2023 1:12 PM
⊟ O Methods		23	31	6/3/2023 10:10 AM
O Mixed Method		1	1	6/3/2023 11:03 AM
⊟ O Qualitative		8	14	6/3/2023 11:02 AM
⊞ O Data Collection		5	5	6/7/2023 10:46 AM
⊞ O Inquiry		4	4	6/7/2023 10:35 AM
⊞ O Sampling		4	4	6/7/2023 10:37 AM
O Quantitative		14	14	6/3/2023 11:02 AM
O SLR		2	2	6/9/2023 1:38 PM
⊟ O Respondents		21	52	6/6/2023 3:10 PM
O Boomers (1946-1964)		9	9	6/6/2023 3:30 PM
O Existing investors		3	3	6/6/2023 3:32 PM
O Gen X (1965-1980)		11	11	6/6/2023 3:30 PM

Codes				
⊕ Name	^ ≡	Files	References	Created on
⊟ O Respondents		21	52	6/6/2023 3:10 PM
O Boomers (1946-1964)		9	9	6/6/2023 3:30 PM
O Existing investors		3	3	6/6/2023 3:32 PM
O Gen X (1965-1980)		11	11	6/6/2023 3:30 PM
O Gen Z (1998-2012)		12	12	6/6/2023 3:30 PM
O Millennials (1981-1997)		17	17	6/6/2023 3:28 PM
⊟ O Underpinning Theory		12	14	6/3/2023 10:10 AM
O Agency Theory		1	1	6/9/2023 8:50 PM
O Innovation Diffusion Theor		2	2	6/7/2023 4:56 PM
O RC-TAM		1	1	6/9/2023 1:52 PM
O TAM		3	3	6/6/2023 3:35 PM
O Theory of Reasoned Actio		1	1	6/9/2023 10:57 AM
O UTAUT		5	5	6/8/2023 9:34 AM
O UTAUT2		1	1	6/7/2023 10:08 PM

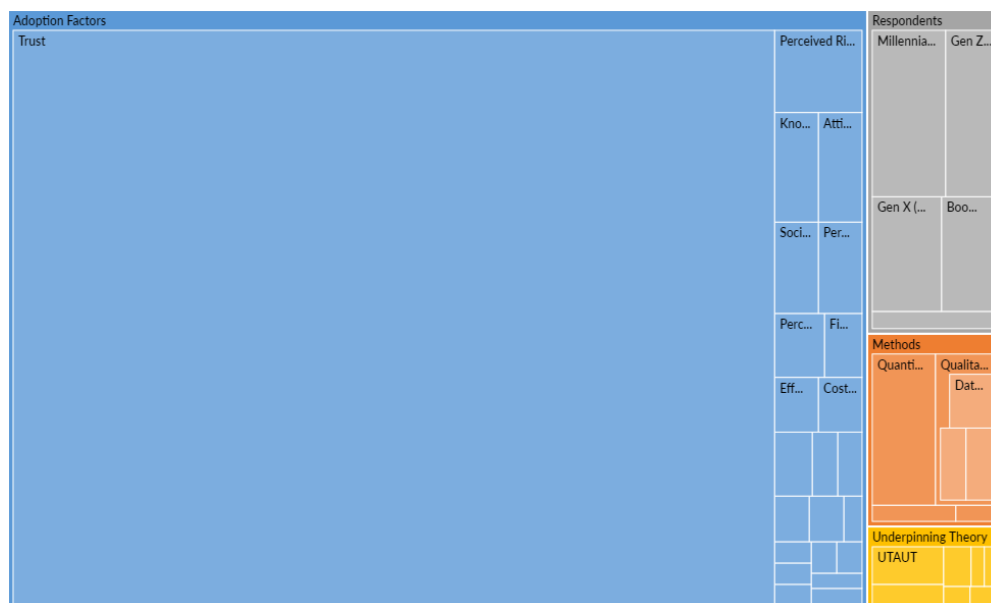**Figure 3: Axial Codes**

Source: Results from NVivo software

Figure 4: Hierarchy Chart of Codes

Source: Results from NVivo

Results and Discussions

To answer RQ1, findings from the above analysis show that most previous literature identified certain adoption intention factors on using robo-advisory investment such as attitude, cost-effectiveness, effort expectancy, facilitating conditions, financial experience, perceived ease of use, perceived security, perceived usefulness, performance expectancy, and social influence. However, the most common factors triggered are financial literacy, perceived trust, and perceived risk, which need further investigation. Figure 5 shows the proposed conceptual framework based on the findings reviewed by the researcher.
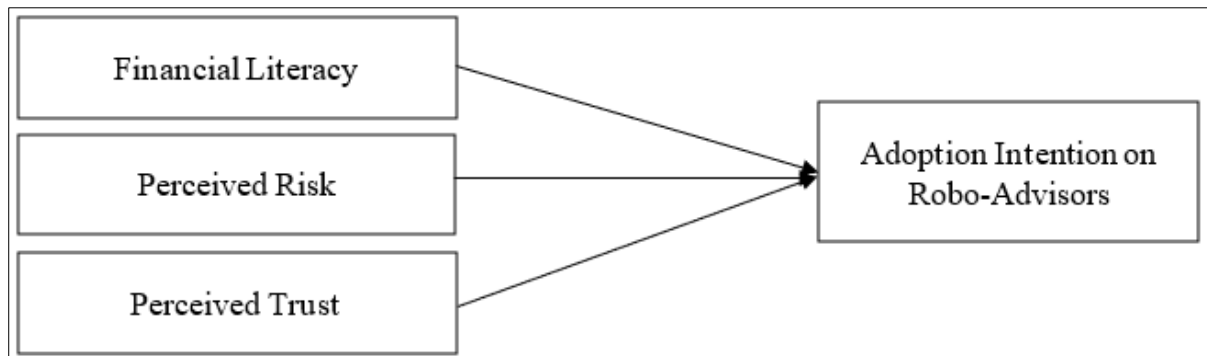

Figure 5: Proposed conceptual framework
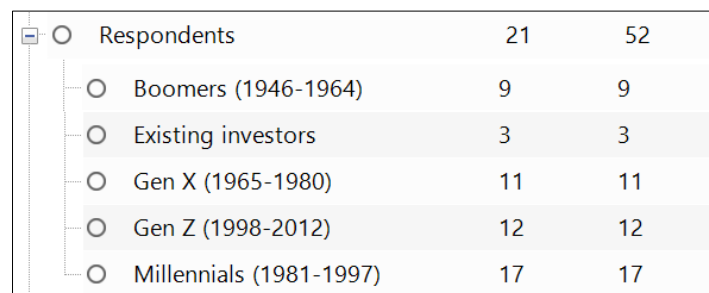
Source: Results from NVivo

Financial literacy refers to acquiring a comprehensive range of competencies and information enabling individuals to make judicious and efficient choices regarding their financial assets. Enhancing financial literacy levels enables individuals to make more informed decisions regarding their financial investments (Bayar et al., 2020). Ahmad and Shah's (2022) research uncovered a noteworthy positive correlation between financial literacy, investment choices, and investment outcomes. In addition, Bayar et al. (2020) econometric analysis findings suggest a positive relationship between financial risk tolerance, financial literacy level, and educational level. This relationship is attributed to the fact that these factors facilitate making complex financial decisions. The inadequate level of financial literacy among individuals poses a significant challenge to their preparedness to engage in stock market investment, which necessitates a comprehensive grasp of fundamental concepts of the economy, industry, and companies.

Bruckes et al. (2019) have highlighted that trust plays an ever more critical part in the current society due to the rapid advancement of various modern technologies, hence, individuals can place their trust in one another. Studies have shown that trust may be transferred between different people, places, and situations after that time. Besides, Kwon et al. (2022) have used the term 'perceived safety' to measure the degree to which users feel safe and trust in using the robo-advisers from any personal-information leakage, system error, and financial losses. The results have shown a significant relationship between innovation resistance and acceptance, thus suggesting that safety or trust is an important factor in accepting robo-advisers. Even though Cheng et al. (2019) found that the higher level of trust in the expert human advisor is primarily driven by higher levels of emotional trust, whereas the higher level of trust in the robot advisor is the result of higher levels of cognitive trust, the result suggests that developing trust is critical for robo-advisor acceptance. Firms utilising robo-advisors can share other users'

testimonials, explain the decision-making processes of algorithms used by robo-advisors, and develop a social presence through instant chat/avatar to boost consumer trust perceptions.

When utilising behavior, the perceived risk might be a substantial impediment. It stems from the customer's fear or confusion about the behavior, as well as the potential negative consequences of using certain goods or services (Ashrafi & Kabir, 2023). Researchers discovered that trust and perceived risk are important in understanding why people accept information and communications technology (ICT) in the digital investment or e-business environment. However, attempts to incorporate trust and perceived risk into the UTAUT have been restricted to propositions linked to conceptual frameworks or confirmation of features of their causal links, rather than empirical assessment in field investigations. Furthermore, while several research has investigated the integration of perceived risk and trust throughout technological deployment and usage, only a few have demonstrated links between perceived risk, trust, and Fintech behavioral intentions (Ashrafi & Kabir, 2023).

In terms of identifying potential respondents and answering RQ2, this analysis recognised that millennials are the most targeted respondents for this study (see Figure 6). It is because they are actively seeking for a variety of income generated.

Respondents		21	52
Boomers (1946-1964)		9	9
Existing investors		3	3
Gen X (1965-1980)		11	11
Gen Z (1998-2012)		12	12
Millennials (1981-1997)		17	17

Figure 6: Axial Codes for Respondents

Source: Results from NVivo

Conclusions

From the review, both objectives have been achieved. This study brings insightful ideas to the interested parties, especially to the researchers, investors, and policymakers, who can learn thoroughly about the factors that may affect the adoption intention to invest in robo-advisors. The result may help them to shift to a better line regarding the effectiveness of adopting robo-advisors as one of their portfolio investments, thus contributing to more impactful social financial awareness and intention. The limitation of the study is relying on the Scopus and Web of Science databases for evaluation may have led to biased outcomes. Furthermore, this analysis disregards items that were published in other languages. It should have also considered language bias and technical challenges. Future research could explore the impact of financial education interventions on financial literacy and investment behavior. Furthermore, exploring the connection between perceived risk and perceived trust in greater detail would be valuable.

Acknowledgment

References

Abraham, F., Schmukler, S. L., & Tessada, J. (2019). Robo-advisors: Investing through machines. *World Bank Research and Policy Briefs*, *1*(134881), 1–4.

Ashrafi, D. M. (2023). Managing consumers' adoption of artificial intelligence-based financial robo-advisory services: A moderated mediation model. *Journal of Indonesian Economy and Business*, *38*(3), 270–301. https://doi.org/https://journal.ugm.ac.id/v3/jieb

Ashrafi, D. M., & Kabir, M. R. (2023). Human or AI? Understanding the key drivers of customers' adoption of financial robo-advisory services: The role of innovation resilience. *Journal of Global Business and Technology*, *19*(1), 18–40.

Bayar, Y., Sezgin, H. F., Öztürk, Ö. F., & Şaşmaz, M. Ü. (2020). Financial literacy and financial risk tolerance of individual investors: Multinomial Logistic Regression approach. *SAGE Open*, *10*(3). https://doi.org/10.1177/2158244020945717/ASSET/IMAGES/LARGE/10.1177_2158244020945717-FIG1.JPEG

Belanche, D., Casaló, L. V., & Flavián, C. (2019). Artificial intelligence in FinTech: Understanding robo-advisors adoption among customers. *Industrial Management & Data Systems*, *119*(7), 1411–1430. https://doi.org/10.1108/IMDS-08-2018-0368

Bhatia, A., Chandani, A., Atiq, R., Mehta, M., & Divekar, R. (2021). Artificial intelligence in financial services: A qualitative research to discover robo-advisory services. *Qualitative Research in Financial Markets*, *13*(5), 632–654. https://doi.org/10.1108/QRFM-10-2020-0199/FULL/PDF

Bruckes, M., Westmattelmann, D., Oldeweme, A., & Schewe, G. (2019). Determinants and barriers of adopting robo-advisory services. *40th International Conference on Information Systems, ICIS 2019*, 1–9.

Chandani, A., Sriharshitha, S., Bhatia, A., Atiq, R., & Mehta, M. (2021). Robo-advisory services in India: A study to analyse awareness and perception of millennials. *International Journal of Cloud Applications and Computing*, *11*(4), 152–173. https://doi.org/10.4018/IJCAC.2021100109

Cheng, Guo, F., Chen, J., Li, K., Zhang, Y., & Gao, P. (2019). Exploring the trust influencing mechanism of robo-advisor service: A mixed method approach. *MDPI Sustainability*, *11*(4917), 1–20. https://doi.org/doi:10.3390/su11184917

Fan, L., & Chatterjee, S. (2020). The utilization of robo-advisors by individual investors: An analysis using diffusion of innovation and information search frameworks. *Journal of Financial Counseling and Planning*, *31*(1), 130–145. https://doi.org/10.1891/JFCP-18-00078

Isaia, E., & Oggero, N. (2022). The potential use of robo-advisors among the young generation: Evidence from Italy. *Finance Research Letters*, *48*, 103046. https://doi.org/10.1016/J.FRL.2022.103046

Jung, D., Dorner, V., Weinhardt, C., & Pusmaz, H. (2018). Designing a robo-advisor for risk-averse, low-budget consumers. *Electronic Markets*, *28*(3), 367–380. https://doi.org/10.1007/S12525-017-0279-9/METRICS

Khoo, C. C., Ong, S. F., & Liew, C. Y. (2024). Factors which affect investors' intention to adopt robo-advisory services in Malaysia. *2nd International Conference on Automotive, Manufacturing, and Mechanical Engineering*, 1–10. https://doi.org/10.1063/5.0182740

Ku, Y.-C., & Wang, H.-X. (2022). The factors influencing the willingness of investors to use robo-advisors. *International Conference on Human-Computer Interaction*, 286–299. https://doi.org/10.1007/978-3-031-05544-7_22

Kwon, D., Jeong, P., & Chung, D. (2022). An empirical study of factors influencing the intention to use robo-advisors. *Journal of Information and Knowledge Management*, *21*(3), 1–24. https://doi.org/10.1142/S0219649222500393

Nain, I., & Rajan, S. (2023). Algorithms for better decision-making: A qualitative study exploring the landscape of robo-advisors in India. *Managerial Finance*. https://doi.org/10.1108/MF-01-2023-0055

Nourallah, M. (2023). One size does not fit all: Young retail investors' initial trust in financial robo-advisors. *Journal of Business Research*, *256*, 113470. https://doi.org/10.1016/j.jbusres.2022.113470

Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, *37*(1), 879–910. https://doi.org/10.17705/1cais.03743

Roh, T., Park, B., & Xiao, S. (2023). Adoption of AI-enabled robo-advisors in FinTech: Simultaneous employment of UTAUT and the Theory of Reasoned Action. *Journal of Electronic Commerce Research*, *24*(1), 29–47.

Sani, I. A., & Koesrindartoto, D. P. (2019). The empirical study towards the acceptance of robo-advisory for digital wealth advisor: An Indonesian university student perspective. *4th ICMEM 2019 and 11th IICIES 2019*, 112–117.