**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

# The Evolution of Robo-advisor: So far, a Bibliometric Analysis of Adoption and Pattern.

Saba Fatima[1], Syed Afzal Ahmad[2]
[1] *Department of Commerce, Integral University, Lucknow*
[2] *Integral Business School, Integral University, Lucknow*

**ARTICLE INFO**

Received: 30 Dec 2024

Revised: 05 Feb 2025

Accepted: 25 Feb 2025

**ABSTRACT**

**Introduction**: This article attempts to present a comprehensive knowledge map and conceptual framework about the development of robo advisors in retail investor wealth management. It examines a nine-year dataset gathered from the databases of ProQuest, Enesco, Web of Science, and Scopus, where the data were collected and examined following the SPAR-4-SLR procedure. The publications published between 2014 and 2025 were examined using bibliometric analysis and a systematic literature review strategy, employing a suite of software programs, including VOSViewer and Bibliography R.

**Objectives**: This study aims to provide a thorough conceptual framework and knowledge map about the evolution of robo-advisers in retail investor wealth management. It addresses the research question, such as: What is the trend of publications on robo-advisors?

What are the top journals, articles, authors, countries, and institutions for robo-advisor research? What are the knowledge clusters in the intellectual structure of a robo-advisor?

And: What future opportunities are there in robo-advisor research

**Methods**: This Bibliometric review paper utilizes technology to collect information from online scientific databases, including ProQuest, Web of Science, EBSCO, and Scopus. Specialized programs, including Microsoft Excel, VOSviewer, and Bibliometrix-R, were utilized to analyze the data further. To ensure transparency and repeatability of the study, the systematic literature review for this topic is conducted by the SPAR-4-SLR review protocol (Paul et al., 2021).

**Results:** The publishing pattern shows a consistent increase in research on robo-advisors. The pattern shows that although a study on robo-advisors existed before the COVID-19 pandemic, the sharp rise in 2020–2021 indicates that market disruptions brought on by the pandemic and the increase in digital financial services significantly boosted scholarly interest. The field has attained permanence, rather than being a passing research trend, as evidenced by the consistent publication of at least four annual papers beyond 2020. The small number of prestigious publications, however, suggests that there are numerous opportunities for excellent contributions.

Furthermore, transparency and social media play important roles, and trust emerges as a critical predictor of adoption, particularly among young retail investors. Market heterogeneity is highlighted by the mixed performance findings, which suggest that robo-advisors are more advantageous for less diversified investors than for more diversified ones. Research prospects for larger research communities and cross-cultural validation are revealed by the focus on a small number of prolific authors and particular geographic markets (India, China, Germany, and the US).

**Conclusions:** In conclusion, this analysis of robo-advisors showa how they affect the behaviour of retail investors. It highlights the important role they play in supplying financial data and assisting with well-informed decision-making. Numerous benefits are provided by robo-advisors, such as reduced fees, automated portfolio management, and easier accessibility. There is conflicting evidence regarding the effectiveness of robo-advisors versus traditional investment strategies. When deciding between robo-consultants and traditional financial advisors, it is crucial to take into account personal needs and financial risk tolerance. Even though technology

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

has revolutionised retail investing, much more has to be discovered about how these developments affect investor behaviour. Future studies should look into how robo-advisors' technical advancements might be used to help retail clients make better investing choices while reducing the

**Keywords:** Robo-advisor, Retail Investor,

## INTRODUCTION

Robo-advisors are transformative fintech tools that make financial advisory services accessible, efficient, and personalized for retail investors. By shifting from human advisors to automated platforms, robo-advisors streamline financial decision-making, reduce costs, and improve accessibility. Advanced platforms leverage AI and big data for real-time portfolio optimization and risk assessment, enhancing data-driven wealth management.

Enabled by machine learning and algorithms such as NLP and hybrid time-series models, robo-advisors reduce human biases and enhance accuracy in stock forecasting. They offer goal-oriented asset allocation tailored to investor preferences and risk tolerance. Integrating AI chatbots is recommended to enhance user experience and personalization further.

Robo advisors have experienced rapid development and have become popular assets in global financial markets (Białkowski, 2020; Fang et al., 2021; Li et al., 2021a), attracting attention from the media, individual investors, institutional investors, and regulators and becoming an important and actual topic in several fields of academic research.

Moreover, investment decisions are influenced by various factors, including access to information (Agarwal et al., 2017; Ahmad et al, 2015) and the necessary infrastructure (Lau, 2002) for executing trades. The use of technology in trading practices has undergone significant evolution since the advent of the Internet. Initially, the Internet provided a platform for traders to access market data and execute trades remotely, removing the need to rely on a physical trading floor (Odean, 2001). The financial services provided by the Internet facilitate the process of executing financial transactions easily and comfortably, and transcend both time and space limitations. This implies that the services can be accessed and used from anywhere in the world, even when a person is not physically present, provided an internet connection is available. It became an indispensable tool for traders and investors, providing vast amounts of real-time data and analysis (Abroud, 2012).

Technology has significantly impacted trading practices, starting with the internet and mobile technology, which provide access to information and trading from anywhere (Badruddin, 2015). Robo advisors have become a critical source of information and opinions about financial markets and individual investments. Robo-advisors can impact investor sentiment and decision-making.

Over the past decade, some prominent research has been conducted on robo advisors, most of which has been qualitative, as qualitative studies are typically conducted when a new and emerging phenomenon is being explored. While a growing body of research exists on the factors influencing investor behavior towards trading, very little has been done to discuss what led to the adoption and post-adoption impact of the robo advisor on retail investments. Additionally, no research has been conducted tracing the evolution of the robo-advisor so far Thus there is a significant knowledge gap present in the relevant literature regarding the impact of evolving robo advisors, As a result, this study will serve as a guide for future research on the robo-advisor that will shed light on the reasons, impact, and developments thus far.

Objectives

RQ1. What is the trend of publications on robo-advisors?

RQ2. What are the top journals, articles, authors, countries, and institutions for robo-advisor research?

RQ3. What are the knowledge clusters in the intellectual structure of a robo-advisor?

RQ4. What future opportunities are there in robo-advisor research?

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

Methods

This bibliometric review paper is a systematic literature review (SLR) that utilizes technology to gather data from online scientific databases, including Scopus, Web of Science, EBSCO, and ProQuest. The data was further analyzed using specialized software such as Bibliometrix-R, VOSviewer, and Microsoft Excel. The current study's systematic literature review is conducted according to a review protocol, SPAR-4-SLR, which outlines the specific actions and stages followed during the review process to ensure transparency and the capacity to replicate the study. As systematic literature reviews in the social sciences have grown, academics have developed a new review process for business research. This study adopts the SLR technique known as SPAR-4-SLR (Paul et al., 2021) based on scientific procedures and reasoning. The SPAR-4-SLR methodology outlines a three-stage SLR process: assembling, arranging, and assessing (i.e., 3 As) as given by scholarly articles (Paul et al., 2021). There are numerous systematic literature reviews, such as bibliometric, thematic, framework, theory, and technique reviews. Nevertheless, Bibliometric reviews are the most widely acknowledged pragmatic approach, as they collect extensive data and employ technological tools, such as software and vast online scientific databases, to perform statistical, quantitative, and qualitative analyses. Further, the analyses are used to compile and report on the scholarly performance literature and scientific knowledge in the given field (Mukherjee et al., 2021).

As bibliometric reviews are supported by technology, they can also handle and analyze an extensive database of publications that would not be efficiently possible in other review types, which typically rely on manual coding and analysis. This technology-enabled systematic literature review, which utilizes an extensive database of publications, is more reliable and scientific than other databases that have fewer publications, which would not yield authentic and thorough findings.

In our review, our approach includes a broader keyword scope, as we do not consider restrictive words related to robo-advisor and retail investor behavior. Therefore, the selected keywords are “robo advisor” and “Retail investor.” As mentioned above, the resulting papers and documents from all the selected databases then undergo various stages of the PRISMA protocol.

2.1. Assembling

The first stage of the SPAR-4-SLR protocol is assembling. The review assembly process consists of two sub-stages: identification and acquisition. In identification, this review sets out to identify publications relating to “robo advisor” (domain) and to highlight the performance in the area of robo advisor(RQ1 and RQ2) and intellectual structure (RQ3 and RQ4) of its research (research questions). Specifically, this review focused on journal publications (source type) indexed in Scopus, Web of Science, EBSCO databases, and ProQuest. The decision to emphasize these databases was made to ensure the inclusion of quality publications as these publications serve finished research that has undergone thorough peer review, in contrast to Paul et al, (2021) other publications such as conference proceedings, books, and chapters from books are included to have a robust overview on the robo advisor, less number of publication is available for review, whereas the decision to use Scopus, Web of Science and EBSCO as a first-stage source quality measure is due to the database’s high-quality criteria for indexing in addition to its utility to act as a one-stop article search and acquisition mechanism, along with this three databased publication. Published dissertations from ProQuest are included because they represent a vast share of the publications on robo advisors, which also represents critical criteria for generating insights into the field. Mostly, the reason for these choices aligns with Paul et al.’s (2021) SPAR-4-SLR recommendations (2021) and past reviews (Kumar et al, 2022). In this sense, the identification phase establishes the parameters for the scope of the review. In the acquisition process, this review uses the Scopus database, Web of Science, and EBSCO and ProQuest database to search and acquire its data (search mechanism and material acquisition) because this database provides bibliometric information for all publications and sources that it indexes (which cannot be found in other databases like Google Scholar), including efficient ways to download all that information as well as the full text of publications easily within few clicks (Donthu et al., 2021c).

Moreover, using Scopus, Web of Science, EBSCO, and ProQuest over alternative options enables the review to consider a broader range of high-quality journals, given the publication. The start year of the search is set to 2014, allowing for consideration of all relevant publications within 10 years, i.e., 2014 to 2025, when the search was conducted (search period). The keywords for the search were based on an exploratory assessment of prior literature

by subject experts, then a search on the Scopus database using the macro keywords of "robo advisor," "retail investor," and all the publications in the search results from four major databases were analyzed to obtain prominent keywords that are commonly referred interchangeably. After a rigorous screening, this initial screening revealed that few earlier research studies had used a robo advisor with a robo advisory service to represent scholarly work on robo advisors. Additionally, a range of keywords was used, including "robo advisor and retail investor." The subject experts collectively affirmed the following search string: TS = {(robo advisor *)} AND {(retail investor *) The "TS" operator allows a search in titles, abstracts, and keywords, as performed. Moreover, "*" reflects truncation, which enables the word's different forms and spellings to be included (Paul et al., 2021). In total, 24 articles from the Scopus database, five from the Web of Science, 16 from the EBSCO database, and 49 dissertation works from ProQuest were returned from the assembly stage.

Moreover, by referring to Scopus, Web of Science, EBSCO, and ProQuest, rather than relying on alternative options, the review can consider a broader range of high-quality journals. Since the emergence of the nascent robo-advisor phenomenon, research is still ongoing, and there is limited empirical work at this stage. Furthermore, dissertation work from ProQuest was also included, given the recent increase in research on dissertations related to robo-advisors. Hence, more than 50% of the research contributions on the impact of robo-advisors on investor behavior are from the dissertation.

The start year of the search is set to 2014, allowing for consideration of all relevant publications within a 10-year period, i.e., 2014 to 2025, as it was only in the early 2010s that the impact of robo advisors on retail investors began to gain notice in research.

The keywords for the search were finalized based on an exploratory assessment of existing literature., whereby a search on the Scopus database was conducted using the macro keywords of "Robo Advisor," and "investor," and the major publications in the search results were analyzed to obtain prominent keywords that have been commonly used interchangeably. After a thorough screening, this initial evaluation revealed that keywords, such as "robo advisor" and "retail investor," were used to represent the retail investor behavior impacted through the robo advisor." The subject experts collectively affirmed the following search string: TS = {(robo-advisor*)} AND {(retail investor*) OR (young investor*). The "TS" operator allows a search in titles, abstracts, and keywords, as performed. Moreover, "*" reflects truncation, which enables the word's different forms and spellings to be included (Paul et al., 2021). In total, 24 articles from the Scopus database, five from the Web of Science, six from the EBSCO database, and 49 dissertations from ProQuest were returned from the assembly stage.

### 2.2. Arranging

Furthermore, at the arranging stage of the review, there are two sub-stages: organization and purification. For this review, the organization depends on the categorical filters offered by Scopus, the Web of Science, and the EBSCO database. For the 1st stage, the organization of publications requires screening, which necessitates categorization according to document type and language. As part of the SPAR-4-SLR protocol for organizing the edited list of publications for the second-stage organization, the journal is ranked in the ABDC JQL. Notably, we skipped this step as a few research papers were listed in the A* and A categories. For purification, this review uses a two-step method that aligns with the approach used for the organization. In particular, the first-stage purification includes only "articles" (document type) (as others document such as "editorials" and "notes" have not gone through peer review process thus may not be reliable) that are written in "English" (language) (as the authors are only proficient in that language) and published in "journals" (source type) (for getting only reputed and relevant papers) consistent Donthu et al. (2021c), after filtering data result from assembling stage article and reviews filter gives 94 publications from Scopus, web of science and EBSCO and ProQuest database. Further, applying the language filter yielded the same number of document results from the Scopus, Web of Science, and EBSCO databases.

### 2.3. Assessing

The assessing stage of the review consists of two sub-stages: first, evaluation, and second, other reporting. This review evaluates 94 publications in terms of their collective performance. It maps the body of knowledge (i.e., knowledge clusters in the cognitive structure) that collectively contribute to and represent investor behavior concerning the robo advisor. Bibliometrix-R and Microsoft Excel were used to run a performance analysis to look at

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

the publication trend (RQ1) and the top journals, authors articles, countries, and institutions in the concerned field (RQ2), and a science mapping using a co-authorship analysis of countries and authors, (RQ2), and institution, With VOSviewer and Bibliometric-R, a co-occurrence analysis of keywords (RQ3) is carried out. VOSviewer 1.6.8 is the bibliometric tool used for the bibliometric analysis.

The VOS viewer tool makes it practical to see the outcomes of a co-occurrence matrix, where Co-occurrences result from the presence, consistency, and proximity of linked pairs of cited references within the data. (Waltman & van Eck, 2014).

Moreover, bibliometrics-R is a solid research tool designed for researchers to conduct large-scale research analyses of bibliometric data. It provides an extensive array of features to carry out various bibliometric analyses and generates network graphs that visually depict these linkages, facilitating the comprehension of intricate relationships.

The performance analysis that reports the publication profile is a form of descriptive analysis, Similar to presenting participant profiles in empirical research, but with more analytical depth. In contrast, science mapping using co-authorship analysis of authors and countries offers insights into collaborations among contributors. The co-occurrence analysis of keywords provides triangulated insights on the themes (knowledge clusters) (Donthu et al., 2021). This study reports its findings by the convention of previous bibliometric reviews, which recommends the use of a combination of words (accompanying narratives), tables (bibliometrics), and figures (network visualization) (e.g., Donthu et al.; Kumar et al., 2021). Similar to earlier bibliometric evaluations, this one admits that its findings perhaps do not exclusively apply to the accuracy and completeness of bibliometric data on Scopus (Donthu et al., 2021), Web of Science, and EBSCO, as well as the range of topics that can be covered by a bibliometric review (i.e., performance analysis and science mapping).

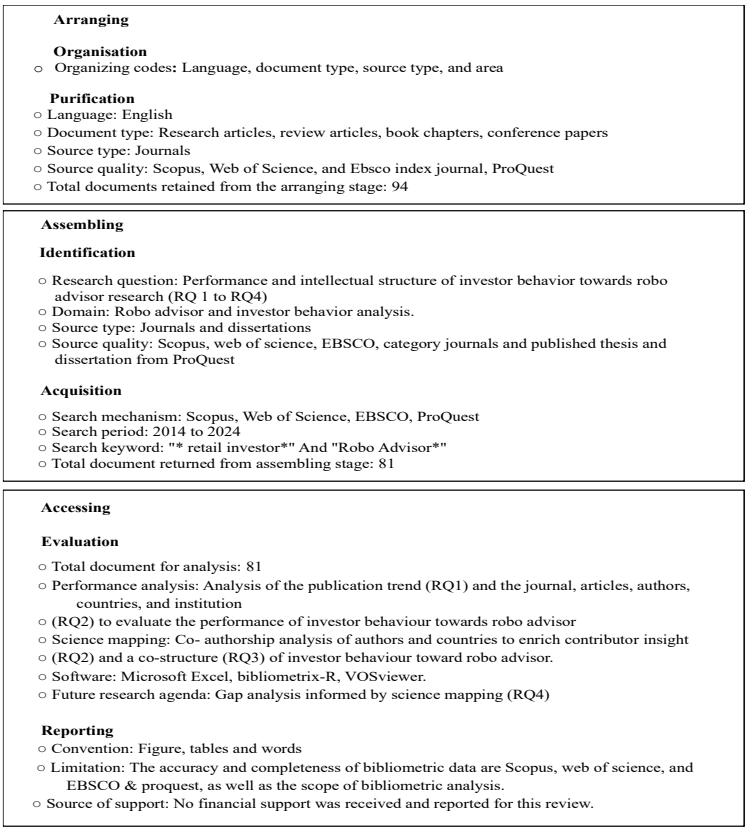


Fig. 1. Procedure for reviewing investor behavior towards EB research using the SPAR-4-SLR protocol.

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

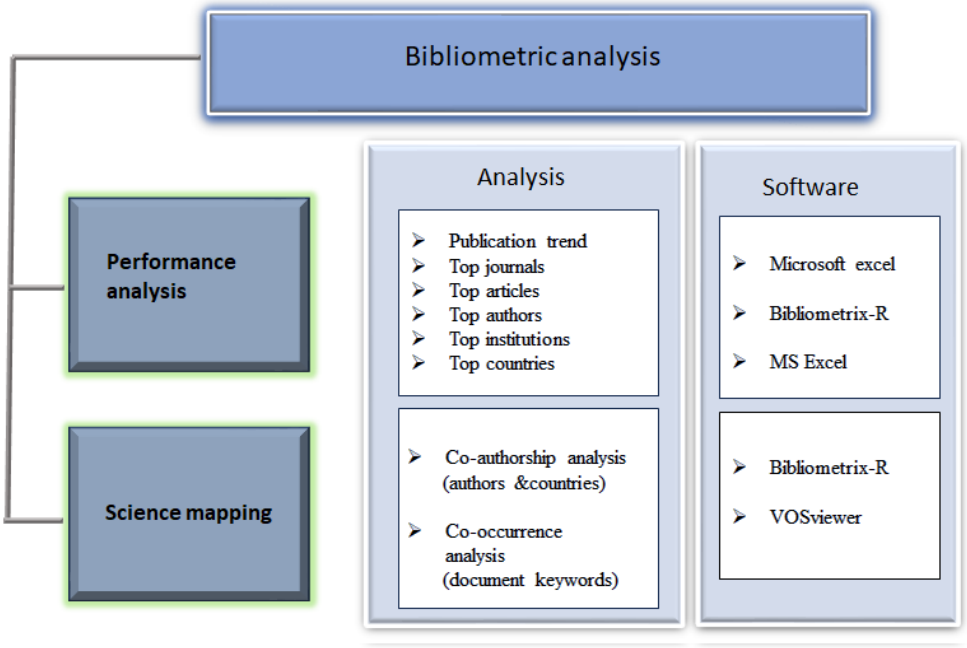


Fig. 2. Bibliometric analysis techniques for reviewing Robo research.

Results

Performance of investor behavior towards the robo-advisor

3.1 Publication trend of robo advisor research (RQ1)

The publication trend of robo-advisor and retail investor research is presented in

Fig. 3. The bar graph illustrates the research appearing in index databases that has grown over the past 7 years. The earliest publication highlights the potential of robo-advisors to disrupt wealth management and suggests that robo-advisors are becoming increasingly accepted and integrated into the financial services realm. Prior to 2020, specifically from 2015 to 2020, this review noted the absence of research papers published in Scopus, Web of Science, and EBSCO. However, after 2020, this review observed prevalent research work in the form of research articles published each year, with a minimum of four articles published

annually. The year 2021 was significant for robo-advisor and retail investor research, as it saw the highest volume of published articles in this field (n: 23),

with a growth rate of 64.28 percent compared to the previous year. Year (n: 14). The proliferation of papers on robo advisors, particularly in the context of the COVID-19 pandemic, highlights their emerging role as valuable tools for guiding retail investor decision-making during crises, consistent with the research hike that has happened in other fields (e.g., bibliometric) (Donthu et al., 2021), This indicating that fintech and retail investing have not been stagnant in terms of knowledge development The healthy proliferation of this fintech among retail investor and research domain.

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

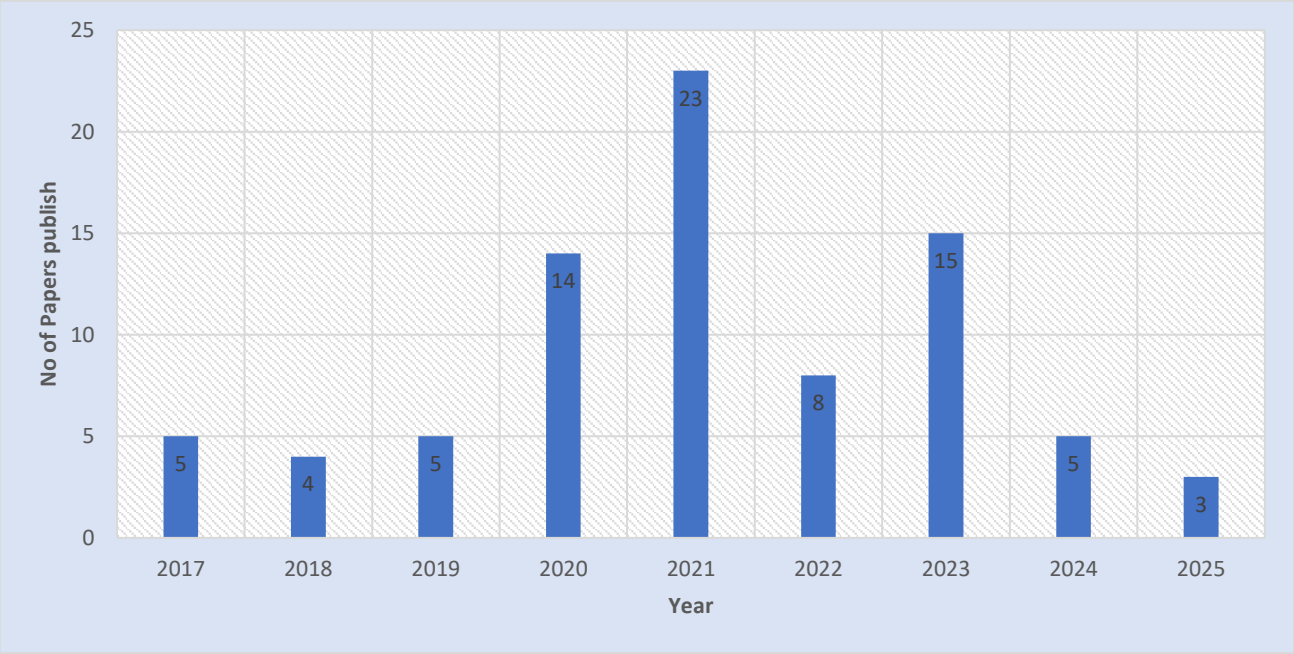


Fig. 3. Publication trend of robo advisor. Notes: Source of data = Scopus, Web of Science, Ebsco, and ProQuest. Period of coverage: 2017-2025. Total publications = 82.

Top journals for Robo advisor research (RQ2)

The top journals for robo-advisor research are given in Table 1. The table shows that only one "A*" journal, the Journal of Financial Economics, has a single research paper published on robo advisors, and eight "A" category journals have published eight articles on robo-advisor research. Among them, the most prolific high-quality journal for behavioral finance and technology research is the Journal of Financial Economics, with an impact factor of 9.34. This is followed by Finance Research Letters with 9.07 (2023 impact factor) and Journal of Business Research with 8.51 three-year impact factor. All these journals have at least one research paper on robo advisors between 2020 and 2025. Taken collectively, the list of journals presented herein suggests that high-quality finance journals have begun to welcome research on financial technology and its impact on investor behavior.

3.3. Top articles for Robo advisor research (RQ2)

The total number of citations any article indexed in Scopus received from other Scopus-indexed articles is what we call global citations (Donthu et al., 2021c; S. Kumar et al., 2021c). The top articles for robo advisor research from the global citations perspective that received the most number of global citations are given in Table 2. The table indicates that the article "The table shows that the article discusses the use of robo-advisors to mitigate investor biases" by Bhatia et al (2020) based on global citations (59), followed by the article entitled "Robo-advisory: Opportunities and risks for the future of financial advisory" by Jung et al (2019) (44 global citations), and the articles entitled " Do sustainable consumers prefer socially responsible investments? A study among the users of robo-advisors" by Brunen and Laubach (2003) (23), global citation and "One size does not fit all: Young retail investors' initial trust in financial robo-advisors" by Nourallah (2023), (10) global citations. Remarkably, most of the articles on this list seem to place robo-advisers and their influence on investor conduct in a supporting role rather than at the forefront.

Notably, a robo-advisor is a central feature in all articles on this list. This highlights the significance of bibliometric reviews.

(i.e., the ability to discern the key articles that within-field research should know and build upon).

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

Table 1. Journals for Robo advisor research

| S.no | Journal | | |
|---|---|---|---|
| 1 | Journal of Behavioural and Experimental Finance | 13 | Australasian Accounting Business & Finance Journal |
| 2 | Journal of Banking and Finance | 14 | Social Business |
| 3 | Journal of Business Research | 15 | Journal of Financial Services Research |
| 4 | Financial Review | 16 | Portuguese Economic Journal |
| 5 | Digital Finance in Europe: Law, Regulation, and Governance | 17 | Organizations & Markets in Emerging Economies |
| 6 | Finance Research Letters | 18 | International Journal of Bank Marketing |
| 7 | International Journal of Business Analytics | 19 | Journal of Financial Reporting & Accounting (Emerald Group Publishing Limited) |
| 8 | Financial Planning Review | 20 | Quantitative Finance |
| 9 | EAI/Springer Innovations in Communication and Computing | 21 | Law & Financial Markets Review |
| 10 | Journal of Business Research | 22 | Journal of Financial Economics |
| 11 | Strategic Change | 23 | Journal of Financial Counseling & Planning |
| 12 | Journal of Empirical Finance | 24 | Electronic Journal of Information Systems in Developing Countries |

Table 2. Top articles for Robo research based on global citations

| Rank | Author full names | Title | Year | Journal | Cited by |
|---|---|---|---|---|---|
| 1 | Bhatia, Ankita; Chandani, Arti; Chhateja, Jagriti | Robo-advisory and its potential in addressing the behavioral biases of investors - A qualitative study in the Indian context | 2020 | Journal of Behavioral and Experimental Finance | 59 |
| 2 | Jung, Dominik; Glaser, Florian; Köpplin, Willi | Robo-advisory: Opportunities and risks for the future of financial advisory | 2019 | Contributions to Management Science | 44 |
| 3 | Brunen, Ann-Christine; Laubach, Oliver | Do sustainable consumers prefer socially responsible investments? A study among the users of robo-advisors | 2022 | Journal of Banking and Finance | 23 |
| 4 | Nourallah, Mustafa | One size does not fit all: Young retail investors' initial trust in financial robo-advisors | 2023 | Journal of Business Research | 10 |
| 5 | Schwinn, Roland; Teo, Ernie G.S. | Inclusion or Exclusion? Trends in Robo-advisory for Financial Investment Services | 2018 | Handbook of Blockchain, Digital | 7 |

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

| | | | | | |
|---|---|---|---|---|---|
| | | | | Finance, and Inclusion | |
| 6 | Zheng, Kai Wei; Cheong, Jin Hao; Jafarian, Mohsen | Intention to Adopt Robo-Advisors Among Malaysian Retail Investors: Using an Extended Version of the TAM Model | 2022 | Lecture Notes in Networks and Systems | 4 |
| 7 | Baulkaran, Vishaal; Jain, Pawan | Who uses robo-advising and how? | 2023 | Financial Review | 3 |
| 8 | Chiu, Iris H-Y | Building a Single Market for Sustainable Finance in the EU-Mixed Implications and the Missing Link of Digitalisation | 2021 | Digital Finance in Europe: Law, Regulation, and Governance | 3 |
| 9 | Oehler, Andreas; Horn, Matthias | Does ChatGPT offer more effective advice than robo-advisors? | 2024 | Finance Research Letters | 3 |
| 10 | Pal, Abhinav; Sharma, Shalini Singh; Gupta, Kriti Priya | The role of analytics and robo-advisory in investors' financial decisions and risk management: Review of literature post-global financial crisis | 2021 | International Journal of Business Analytics | 2 |

Notes: Top articles with the highest global citations according to Scopus as of January 1, 2025.

Table 3. Top authors for Robo research.

| AUTHOR | PAPERS | citation |
|---|---|---|
| Ankita Bhatia | 2 | 59 |
| Arti Chandani | 2 | 59 |
| Nourallah, Mustafa | 2 | 10 |
| Oehler, Andreas | 2 | 3 |
| Horn, Matthias | 2 | 3 |
| Fan lu | 2 | 0 |
| Silva Paulo | 2 | 0 |

Notes: Top authors with at least two published articles on Robo.

Top author's collaboration for Robo research (RQ2)

The top authors for research on robo-advisors are presented in Table 3. The table indicates that A. Bhatia from Symbiosis International University, M. Nourallah from Sunway University, A. Oehler from the University of Bamberg, and H. Matthias from Otto Friedrich University Bamberg are the most prolific authors, with two articles each on robo advisors published in top journals. In one of his co-authored articles, article A, Bhatia, with her co-authors, are among the first to explore the behavioral biases of the investor towards robo advisors from the expert's perspective in efforts to connect robo advisors with the investors' behavioral biases. (Table 3), The remaining authors

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

have published single articles. The comparatively small number of publications linked to the leading writers indicates that there is still tremendous space for growth in the subject, particularly in terms of original and rigorous research published in prestigious journals.

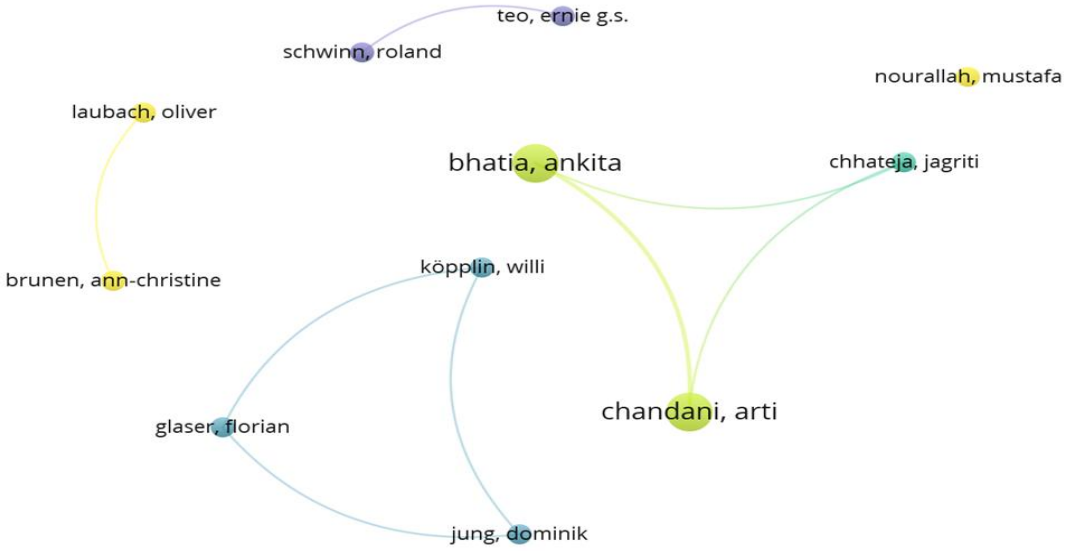


Fig. 4. Author collaboration in Robo research.

3.5. Top countries for research robo advisor (RQ2)

| S.No | County | No of Publication |
|---|---|---|
| 1 | United States | 25 |
| 2 | United Kingdom | 9 |
| 3 | Portugal | 8 |
| 4 | India | 7 |
| 5 | Germany | 5 |
| 6 | Canada | 4 |
| 7 | South Africa | 3 |
| 8 | Turkey | 2 |
| 9 | Malaysia | 2 |
| 10 | Belgium | 2 |
| 11 | Sweden | 2 |

Top institutions for research on Robo advisor (RQ2)

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

| S.no | University | country | publication |
|---|---|---|---|
| 1 | Universidade de Lisboa, Portugal | Portugal | 3 |
| 2 | Walden University | United States | 3 |
| 3 | Universidade NOVA de Lisboa | Portugal | 3 |
| 4 | Symbiosis International University | India | 3 |
| 5 | University of Manchester | United Kingdom | 3 |
| 6 | University of California | United States | 3 |
| 7 | University of Toronto, Canada | Canada | 2 |
| 8 | Kansas State University | United States | 2 |
| 9 | University of Johannesburg | South Africa | 2 |

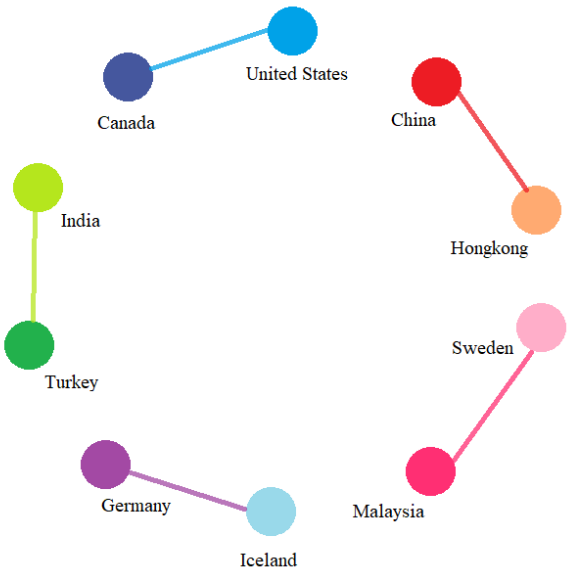


Fig. 6. Country collaboration for Robo research

Table 4. Countries have published on robo-advisors.

| S.No | County | No of Publication | S.No | County | No of Publication |
|---|---|---|---|---|---|
| 1 | United States | 25 | 13 | China | 1 |
| 2 | United Kingdom | 9 | 14 | Hongkong | 1 |
| 3 | Portugal | 8 | 15 | Austalia | 1 |

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

| | | | | | |
|---|---|---|---|---|---|
| 4 | India | 7 | 16 | France | 1 |
| 5 | Germany | 5 | 17 | Georgia | 1 |
| 6 | Canada | 4 | 18 | Kazakhstan | 1 |
| 7 | South Africa | 3 | 19 | Lithuania | 1 |
| 8 | Turkey | 2 | 20 | Qatar | 1 |
| 9 | Malaysia | 3 | 21 | South Korea | 1 |
| 10 | Belgium | 2 | 22 | Singapore | 1 |
| 11 | Sweden | 2 | 23 | Pakistan | 1 |
| 12 | Iceland | 1 | 24 | Indonnesia | 1 |

Science mapping of research on robo-advisor

4.1. Knowledge clusters via co-occurrence of keywords in Robo research (RQ3)

Table 5. Top institutions for Robo research.

| S.no | University | country | publication |
|---|---|---|---|
| 1 | Universidade de Lisboa, Portugal | Portugal | 3 |
| 2 | Walden University | United States | 3 |
| 3 | Universidade NOVA de Lisboa | Portugal | 3 |
| 4 | Symbiosis International University | India | 3 |
| 5 | University of Manchester | United Kingdom | 3 |
| 6 | University of California | United States | 3 |
| 7 | University of Toronto, Canada | Canada | 2 |
| 8 | Kansas State University | United States | 2 |
| 9 | University of Johannesburg | South Africa | 2 |

Notes: Top institutions with three or more published articles on Robo.

4.1.1. Cluster 1

Cluster one comprises 10 research articles of five keywords: artificial intelligence, fintech, innovation, investment knowledge, and investment exploring the use of Robo-advisors in the Indian, Chinese, Hong Kong, German, and US markets and focusing on how Robo-advisors, as one of the fintech tools, make financial advisory services accessible, efficient, and tailored or Retail investors (Oehler & Horn, 2019). Robo-advisors' dependence on financial technology, including big data, AI, and financial engineering, provides users with a personalized experience, tailored investment strategies, and support for informed investment decisions (Zheng et al., as indicated byhatia et al., 2020). Bonelli and Dongul (2023) highlight the significant role of artificial intelligence (AI) in the development and advancement of robo-advisors. AI is used by customer service providers to analyze and integrate user data, offering various advantages for frontline customer support (Kaplan & Haenlein, 2019). Unlike other digital technologies, AI can predict outcomes using complex algorithms and tailor-made services for each customer, eliminating the need for human intervention (Khan & Ahmad, 2024). Additionally, AI interfaces can function independently while interacting, communicating, and providing customer support, and are referred to as service robots (Bonelli & Dongul, 2023).

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

Furthermore, real-time portfolio optimization, wealth management services, and risk assessment are employed to minimize human biases and enhance accuracy in stock forecasting (Potdar & Pande, 2021; Zheng et al., 2022). Robo-advisors bring the shift from human advisors to automated robo-advisors, possessing the capability to replace professional human advisors who are frontline employees in delivering advisory services and directly interacting with customers (Schwinn & Teo, 2018). This streamlines financial decision-making by reducing costs and increasing accessibility to retail investors (Singh & Ahmad, 2008). Offering a new investment advice approach serves a new generation of investors. Understanding their unique choices and preferences can drive further innovation in the technology-driven financial industry (Zhu et al., 2024), which is promising for democratizing access to professional investment advice (Badruddin, A., 2017; Bhatia et al., 2020). It has the potential to be revolutionary and innovative, although it is still in its early stages of development.

Furthermore, investors' knowledge, mobile banking experience, and ownership of specific investments are key factors in decision-making. Risk tolerance and investment types are important for trading. (Fan, 2022). Also, Investors' knowledge, risk tolerance, and time constraints influence their decision to use robo-advisors (Fan & Chatterjee, 2020). Furthermore, Fan and Chatterjee (2020) found that investors with greater risk tolerance and perceived investment knowledge are more likely to adopt robo-advisors, especially those under 65. Here, it is apparent that robo-advisors target younger, more knowledgeable investors seeking efficient and personalized investment solutions. (Fan & Chatterjee, 2020). Additionally, risk tolerance is a factor that affects mobile investment decisions, potentially implying that higher risk tolerance may lead to greater adoption of digital financial services, which could include robo-advisors (Fan, 2023).

Investors who use robo-advisors become more risk-tolerant, as these automated tools influence their willingness to take on higher-risk investments by providing structured guidance (Pietersen et al., 2023). Automated asset allocation platforms can reduce perceived risk by simplifying investment decisions, potentially increasing investor comfort with risk (Kalabayev et al., 2023). Additionally, Millennials' familiarity with digital assets may imply their readiness to use robo-advisors (Bashir et al., 2025), potentially enhancing their tolerance for financial risk by offering tech-driven support (Bhilawadikar & Garg, 2023).

However, there are also some drawbacks to using a robo-advisor service, which can prevent users from switching to it. These include a lack of personalization and customization compared to traditional financial advisors (Bitner, 2000; Zhang,2021). Some investors may prefer the human touch and personalized advice that a traditional financial advisor offers. (Zhang, 2021; Chandani, 2022; Northey et al, 2022). Additionally, it encourages investors to adopt a more passive approach to investing by relying too heavily on automated recommendations and failing to take an active role in managing their portfolios (Lisauskiene, 2021; Tan, 2020). Additionally, there is a risk of over-reliance on algorithms, which could lead to investor alienation from the stock market and a decreased understanding of the investment process and intricacies (Tan, 2020).

4.1.2. Cluster 2

The second cluster comprises five keywords: asset allocation, investment, machine learning, portfolio choice, and technology adoption. It focuses on ease of use, trust, and perceived usefulness, which are the factors that influence investors' willingness to adopt robo-advisory services (Atwal & Bryson, 2021). It provides goal-oriented asset allocation, offering personalized strategies based on investor preferences and risk tolerance (Xiang et al., 2023). However, data security is essential in encouraging robo-advisor adoption (Wall, 2023).

By adopting financial technology, investors benefit from portfolio reshaping, which improves diversification, reduces biases in their investment decisions (Hasanudin, 2025), and lowers costs (Schwinn & Teo, 2018). This technology adoption is especially beneficial for investors who previously had poor diversification or limited exposure to equities, as robo-advisors enhance portfolio performance by increasing the Sharpe ratio, thus achieving better risk-adjusted returns. Additionally, the ease and efficiency provided by robo-advisors reduce the time investors spend managing their portfolios, making the technology appealing and encouraging continued use (Rossi & Utkus, 2024; Banerjee, 2025).

Some Smart Wealth Management Platforms utilize AI and big data for enhanced risk assessment and portfolio optimization (Xiang et al., 2019). which helps retail investors automate investment decisions, addressing their

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

specific needs and preferences (Kalabayev et al., 2023). Derpano Poulos (2018) also critiques traditional portfolio selection methods, suggesting that improvements in asset allocation processes are essential. Merker (2017) highlights the need for effective governance in managing institutional funds, indirectly supporting the idea that technology-driven solutions, such as robo-advisors, could enhance fiduciary effectiveness and investment outcomes (Xiang et al., 2019; Kalabayev et al., 2023; Derpano Poulos, 2018; Merker, 2017).

Machine learning algorithms such as Natural Language Processing (NLP) and hybrid time series models have an increasing role in mitigating human bias in financial advice, with accuracy measured by metrics like RMSE (Potdar & Pande, 2021). Machine learning enables robo-advisors to tailor investment recommendations based on individual goals and enhanced asset allocation (Kalabayev et al, 2023). Rossi and Utkus (2024) examine how machine learning-powered robo-advisors enhance portfolio diversification, reduce fees, and improve risk-adjusted returns. The machine learning models in these studies hold importance for interpreting large financial data sets and personalizing investment recommendations based on investor behavior and market conditions.

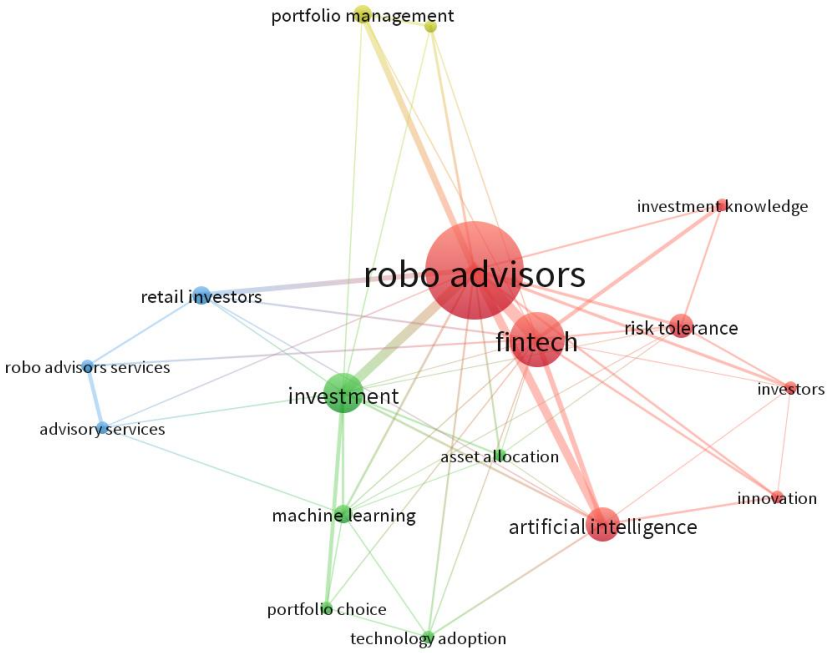


Fig. 7. Knowledge clusters in Robo research. The minimum keyword limit is 2.

4.1.3. Cluster 3

The third cluster comprises three keywords: advisory services, robo-advisor, and robo-advisor services. This cluster entirely highlights various aspects of retail investors' engagement with robo-advisors. Brunen and Laubach (2021) observe that retail investors' sustainable consumption aligns with sustainable investment choices when options are provided by robo-advisors, through self-reported behaviors (Brunen & Laubach, 2021). Nourallah (2022) examines the trust of young retail investors (YRIs) in financial robo-advisors (FRAs), noting that trust propensity and cultural factors influence their acceptance in Malaysia and Sweden. Schwinn and Teo (2018) emphasize that robo-advisors have revitalized retail investor participation by providing accessible, low-cost options across multiple asset classes, fostering an inclusive investment environment.

Nourallah et al. (2022) find that public information and social media influence young retail investors' (YRIs) trust and intent to use robo-advisory services, suggesting that robo-advisors benefit from transparent, widely accessible information. The study emphasizes a need for customized approaches over a "one-size-fits-all" model to engage young retail investors better.

The factors influencing retail investors' adoption of robo-advisory services highlight the role of advanced algorithms in making predictions. Potdar and Pande (2021) emphasize that machine learning, particularly models that minimize errors such as RMSE, is crucial for enhancing stock price predictions, with ARIMA outperforming other models.

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

Furthermore, Bhatia et al. (2023) focus on Indian retail investors, identifying key factors such as trust and innovativeness as motivators for adopting robo-advisory services, although insecurity is one of the primary barriers. It emphasizes the importance of building trust and addressing insecurities to enhance the perceived usefulness of robo-advisors among retail investors.

4.1.3. Cluster 4

Cluster four consists of 18 papers and two keywords, financial advisor and portfolio management, that discuss the varying roles and perceptions of robo-advisors and human financial advisors among retail investors. Oehler, Horn, and Wendt's (2023) qualitative study reveals that experienced human advisors view robo-advisors as suitable for DIY investors. However, relying solely on automation may lead to poor decisions. Furthermore, Oehler and Horn (2023) found that certain personality traits, such as risk tolerance and an internal locus of control, influence students' decisions to use robo-advisors, with robo-users also being more likely to invest independently. Where the algorithm-driven models and tailored approaches facilitate retail investors. Oehler and Horn (2023) highlight the effectiveness of a Smart Beta (SB) portfolio model designed for different risk categories, showing that machine learning can enable robo-advisors to offer risk-adjusted portfolios. Stochastic optimization and advanced mathematical techniques are employed to develop optimal portfolios that either outperform benchmarks or meet specific investment objectives, providing practical applications for both active and passive portfolio management (Al-Aradi, 2023).

Studies on robo-advisors yield mixed results, where some indicating they outperform the market suggesting that these services can beat the market, by providing superior risk-adjusted returns to the investors (Holtfort et al, 2022; Ran Tao, 2020; Vukovic, 2017), some suggest otherwise (Scholz & Tertilt, 2021), (Parker, J. 2022). (Harrison & Samaddar, 2020) A study that simulated competition between a top-rated robo-adviser and recognized human counselors found that human advisers provided superior returns, even after accounting for costs.

The Difference can be explained by D'Acunto (2019), who indicates that under-diversified investors experienced positive effects, including increased portfolio diversification and improved performance for market-adjusted trade and portfolio returns. Highly diversified investors did not experience substantial changes in their portfolio diversification after adopting robo-advice.

It is essential to consider that this may depend on various factors, including the technical details and specifications of the algorithms used by the platform, as well as the overall market conditions. The results of these studies may not be universally applicable to all robo-advisor platforms, and performance may differ depending on how specific different platforms utilize algorithms and investment strategies.

Investors using robo-advisor services should also be aware of the potential risks, including the possibility of losing money in volatile market conditions. Before investing with a robo-advisor service, investors must conduct thorough due diligence, consider their investment goals, and be fully aware of their risk tolerance.

Table 6. Keyword co-occurrence for knowledge clusters in Robo research.

| Keywords | Occurance | TLS | Keywords | Occurance | TLS |
|---|---|---|---|---|---|
| **Cluster - 1** | | | **Cluster - 3** | | |
| Artificial intelligence | 6 | 6 | Advisory service | 2 | 2 |
| Fintech | 10 | 10 | Retail investor | 3 | 3 |
| Innovation | 2 | 2 | Robo advisory service | 2 | 2 |
| Investment knowledge | 2 | 2 | **Cluster - 4** | | |
| Investor | 7 | 2 | finanical Advisor | 2 | 2 |
| Risk tolerance | 4 | 2 | Portfolio management | 3 | 3 |
| robo advisor | 19 | 17 | | | |
| **Cluster - 2** | | | | | |
| Asset allocation | 2 | 2 | | | |
| Investment | 7 | 7 | | | |
| Machine learning | 3 | 3 | | | |
| Portfolio choice | 2 | 2 | | | |
| Technology adoption | 2 | 2 | | | |

**Journal of Information Systems Engineering and Management**
2025, 10(56s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

**Research Article**

Table 7. Top articles for knowledge clusters in Robo research.

## DISCUSSION

The publication pattern shows a steady development in robo-advisor research, beginning with five publications in 2017, followed by 4 in 2018, 5 in 2019, and 14 in 2020, before reaching a peak of 23 articles in 2021 (64.28% growth from 2020). This pattern suggests that while robo-advisor research existed before the COVID-19 pandemic, the dramatic increase in 2020-2021 indicates that pandemic-driven market disruptions and increased digital financial assistance Adoption significantly increased academic interest. The sustained minimum of four annual publications post-2020 indicates the field has achieved permanence rather than representing a temporary research trend.

Additionally, the presence of research in high-impact journals, including the Journal of Financial Economics (IF: 9.34), demonstrates growing academic legitimacy. However, the limited number of top-tier publications indicates significant opportunities for high-quality contributions. The cluster analysis identifies three interconnected research streams: AI-driven technological foundations, practical implementation focusing on trust and usability, and comparative analysis with human advisors.

Further, the trust emerges as a fundamental adoption determinant, especially among young retail investors, with transparency and social media influence playing crucial roles. The mixed performance findings suggest that robo-advisors benefit under-diversified investors more than sophisticated ones, highlighting market heterogeneity. The research concentration among a few prolific authors and specific geographic markets (India, China, Germany, and the US) reveals opportunities for broader research communities and cross-cultural validation.

## 6. CONCLUSION

In conclusion, this review of the robo-advisor and its impact on retail investor behavior underscores the significant role played by the robo-advisor in providing financial information and facilitating informed decision-making. Robo-advisors offer multiple advantages, including lower fees, automated portfolio management, and increased accessibility. Whereas some research suggests that robo-advisors can outperform traditional investment strategies, others indicate mixed results. It is imperative to consider individual needs and financial risk tolerance while choosing between robo-advisors and traditional financial advisors. While technology has transformed the retail investment practice, there is still much to learn about the consequences of these changes on investor behavior. Future research should consider exploring how technological evolution in robo-advisors can be harnessed to facilitate retail investors in making better investment decisions while mitigating the risks associated with cognitive and behavioral bias.

## 7. FUTURE IMPLICATIONS

In recent years, research on robo-advisors has soared. Additionally, it is growing in popularity among consumers, financial educators, and the fintech sector. Further investigation into the broader ramifications for the investing sector may be possible. It enhances the customisation of robo-advisors by being tailored to the specific requirements of individual investor segments. Further the following questions remain open: what financial decisions should individual investors make independently, and what decisions should they delegate to Robo-advisors, depending on individual-specific factors, Further research in the above-suggested fields might provide answers and solutions to the investment industry as to what extent Robo-advisors could remove the influence of investors' behavioural biases and decrease entry barriers to the stock market. Additionally, research is necessary to further understand the factors that can popularize the robo-advisor platforms for those who may benefit from adopting this technology for investment. As Robo-advisors become more innovative, personalized tools for investors should be explored in more studies on Robo-advisors in the investment field, especially research aimed at a better understanding of the underlying mechanisms of causality.

## REFRENCES

[1] Abd Razak, N., & Ismail, K. (2024). A Malaysian perspective on the impact of protection motivation behaviours on robo-advisor adoption during financial crises. Management & Accounting Review (MAR), 23(3), 355-375. https://ir.uitm.edu.my/id/eprint/109340

[2] Ahmad, S. A., Asthana, D. P. K., & Sinha, D. A. (2017). The Role of Corporate Reporting in Emerging Economies as a Source of Investment Information. International Journal of Management, 8(2). http://www.iaeme.com/IJM/index.as
[3] Anshari, M., Almunawar, M.N. and Masri, M., 2022. Digital twin: Financial technology's next frontier of robo-advisor. Journal of Risk and Financial Management, 15(4), p.163. https://doi.org/10.3390/jrfm15040163
[4] Atwal, G., & Bryson, D. (2021). Antecedents of intention to adopt artificial intelligence services by consumers in personal financial investing. Strategic Change, 30(3), 293–298. https://doi.org/10.1002/jsc.2412
[5] Badruddin, A. (2015). Financial Market Infrastructures: A Study on Payment and Settlement Systems in the Indian Banking Sector. International Journal of Engineering Technology, Management and Applied Sciences, 3(2), 179-191.
[6] Badruddin, A. (2017). Conceptualization of the effectiveness of Fintech in financial inclusion. International Journal of Engineering Technology Science and Research, 4(7), 960-965.
[7] Banerjee, S. (2025). Portfolio management with the help of AI: What drives retail Indian investors to robo-advisors? The Electronic Journal of Information Systems in Developing Countries, 91(1), e12346. https://doi.org/10.1002/isd2.12346
[8] Bashir, Z., Farooq, S., Iqbal, M. S., & Aamir, M. (2025). The role of trust in financial robo-advisory adoption: A case of young retail investors in Pakistan. Sustainable Futures, 9, 100538. https://doi.org/10.1016/j.sftr.2025.100538
[9] Bhatia, A., Chandani, A., Atiq, R., Mehta, M. and Divekar, R., 2021. Artificial intelligence in financial services: qualitative research to discover robo-advisory services. Qualitative Research in Financial Markets, 13(5), pp.632-654. https://doi.org/10.1108/QRFM-10-2020-0199
[10] Bhatia, A., Chandani, A., Bhoyar, P. K., & Divekar, R. (2022, December). Factors Influencing the Adoption of Robo Advisory Services: A Unified Theory of Acceptance and Use of Technology (UTAUT) Model Approach. In International Conference on Robotics and Networks (pp. 53-65). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-33826-7_5
[11] Bhilawadikar, V. S., & Garg, E. (2020). Investment attitude of millennials towards cryptocurrencies. Social Business, 10(4), 383-410. https://doi.org/10.1362/204440820X15929907056652
[12] Bonelli, M. I., & Dongul, E. S. (2023). Robo-advisors in the financial services industry: Recommendations for full-scale optimization, digital twin integration, and leveraging natural language processing trends. In 2023 9th International Conference on Virtual Reality, ICVR 2023 (pp. 268–275). 10.1109/ICVR57957.2023.10169615
[13] Brunen, A. C., & Laubach, O. (2022). Do sustainable consumers prefer socially responsible investments? A study among the users of robo-advisors. Journal of Banking & Finance, 136, 106314. https://doi.org/10.1016/j.jbankfin.2021.106314
[14] Chandani, A. (2022). Robo Advisor: Emergence, Present Status, and Future. https://ir.iimcal.ac.in:8443/jspui/handle/123456789/3891
[15] Chitumbura, J. (2017). The evolution of the private offshore wealth management services industry in Zimbabwe following the period of dollarisation. University of Johannesburg (South Africa).
[16] Derpanopoulos, G. (2018). Optimal financial portfolio selection. University of California, Los Angeles.
[17] Fan, L. (2022). Mobile investment technology adoption among investors. International Journal of Bank Marketing, 40(1), 50–67. https://doi.org/10.1108/IJBM-11-2020-0551
[18] 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.
[19] Frank Jr, M. L. (2021). Perceived Advantages and Disadvantages of Investment Management Advice: The Relationship Between Risk Tolerance and Advisor Choice. Wilmington University (Delaware).
[20] Hasanudin (2025). The Impact of Robo-Advisors and Risk Tolerance on Retail Investor Portfolio Performance, Journal of Ecohumanism, 4(pp 26-34) https://doi.org/10.62754/joe.v4i1.5977 Huxley, S.J. and Kim, J.Y. (2016). The short-term nature of robo portfolios. Advisor Perspectives, pp.1–8.
[21] Jamal Khan, A. H., & Ahmad, S. A. (2024). Innovative Approaches to Bank Security in India: Leveraging IoT, Blockchain, and Decentralized Systems against Loan Scams. Journal of Intelligent Systems & Internet of Things, 13(2).

[22] Kalabayev, A., Adilkhanova, A., & Nurguzhina, A. (2023, May). The Future of Retail Investing: Goal-Oriented Asset Allocation Platforms. In 2023 IEEE International Conference on Smart Information Systems and Technologies (SIST) (pp. 202-207). IEEE. 10.1109/SIST58284.2023.10223558
[23] Kim, W. C., Kwon, D. G., Lee, Y., Kim, J. H., & Lin, C. (2020). Personalized goal-based investing via multi-stage stochastic goal programming. Quantitative Finance, 20(3), 515–526. https://doi.org/10.1080/14697688.2019.1662079
[24] Li, X. (2021). Three Essays on FinTech. The Chinese University of Hong Kong (Hong Kong)
[25] Linking the Robo-advisors Phenomenon and Behavioural Biases in Investment Management: An Interdisciplinary Literature Review and Research Agenda.
[26] Merker, C. K. (2017). Asset owner governance and fiduciary effectiveness: The case of public pension plans (Doctoral dissertation, Marquette University).
[27] Musto, D. K. (2020). Robo-advisors and the growth of index-fund governance. Financial Planning Review, 3(3), e1105. https://doi.org/10.1002/cfp2.1105
[28] Nourallah, M. (2023). One size does not fit all: Young retail investors' initial trust in financial robo- advisors— Journal of Business Research, 156, 113470. https://doi.org/10.1016/j.jbusres.2022.113470
[29] Nourallah, M., Öhman, P., & Amin, M. (2022). No trust, no use: How young retail investors build initial trust in financial robo-advisors. Journal of Financial Reporting and Accounting, 21(1), 60–82. https://doi.org/10.1016/j.jbusres.2022.113470
[30] Oehler, A., & Horn, M. (2024). Does ChatGPT provide better advice than robo-advisors?. Finance Research Letters, 60, 104898. https://doi.org/10.1016/j.frl.2023.104898
[31] Pal, A., Sharma, S. S., & Gupta, K. P. (2021). The Role of Analytics and Robo-Advisory in Investors' Financial Decisions and Risk Management: Review of Literature Post-Global Financial Crisis. International Journal of Business Analytics (IJBAN), 8(2), 46–62.
[32] Pietersen, J., Ferreira-Schenk, S., & Dickason, Z. (2021). Are robots taking over? Technological advancements and investor risk tolerance. Acta Universitatis Danubius. Œconomica, 17(4).
[33] Potdar, A., & Pande, M. (2021, July). Comprehensive Analysis of Machine Learning Algorithms Used in Robo-Advisory Services. In Journal of Physics: Conference Series (Vol. 1964, No. 6, p. 062105). IOP Publishing.
[34] Rossi, A. G., & Utkus, S. (2024). The diversification and welfare effects of robo- advising. Journal of Financial Economics, 157, 103869. https://doi.org/10.1016/j.jfineco.2024.103869
[35] Schwinn, R., & Teo, E. G. (2018). Inclusion or exclusion? Trends in robo-advisory for financial investment services. In Handbook of Blockchain, Digital Finance, and Inclusion, Volume 2 (pp. 481–492). Academic Press.
[36] Singh, A, Ahmad, S., Singh, R(2018). Evolution in the Finance Sector in India: Fintech. International Journal of Business Economics and Management Research,7(3)
[37] Skiera, V. (2021). The Microstructure of Financial Markets: Insights from Alternative Data. ProQuest Dissertations Publishing.
[38] Steennot, R. (2021). Robo-advisory services and investor protection. Law and Financial Markets Review, 15(3-4), 262–277. https://doi.org/10.1080/17521440.2022.2153610
[39] Vijaya, C., Hati, K., & Thenmozhi, M. (2024). Developing a Security Risk Assessment-based Smart Beta Portfolio Model for Robo Advising. Australasian Accounting, Business and Finance Journal, 18(3), 7–25. https://doi.org/10.14453/aabfj.v18i3.02
[40] Wall, D. J. (2023). Understanding US Customers' Intention to Adopt Robo-Advisor Technology (Doctoral dissertation, Walden University).
[41] Walsh, B. (2023). Personal financial management technology: extending UTAUT2 to understand the determinants of the acceptance and use. Kansas State University.
[42] Xiang, Y., Li, Z., Lee, T.-H., Tang, D., Wu, K., Lei, Z., & Wang, Y. (2019). Innovative wealth management system for robo-advisory. In CIFEr 2019 - IEEE Conference on Computational Intelligence for Financial Engineering and Economics. 10.1109/CIFEr.2019.8759063
[43] Zheng, K. W., Cheong, J. H., & Jafarian, M. (2022). Intention to adopt robo-advisors among Malaysian retail investors: Using an extended version of TAM model. Lecture Notes in Networks and Systems, 299, 658–672. https://doi.org/10.1007/978-3-030-82616-1_54