The Impact of Robo-Advisors on Decision Support Management in a South African Financial Sector

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Abstract

The financial sector is undergoing significant transformation due to technological advancements, particularly the rise of Robo-advisors, a subset of Artificial Intelligence (AI) that provides and enhances the efficiency of financial advisory services. This study investigates the transformative influence of robo-advisors on decision-support management in the South African financial sector, addressing pertinent challenges and opportunities. Notable findings from a comprehensive literature analysis reveal a discourse centred on applied digital skills within specific sectors such as education, accounting and health. However, there are limited discussions surrounding the challenges and opportunities of implementing robo-advisors in the South African financial sector. The study's findings reveal several key insights, including the factors influencing Robo-Advisors' acceptance (lack of trust in AI and data security), the role of digital skills in implementation, and the impact of employment within financial advisory services. These findings highlight informed decisions for effective adoption and integration of Robo-advisors in the South African financial sector, fostering efficiency, productivity and competitiveness. Future research should continue to explore the evolving role of Robo-advisors and their implications for the financial industry.

1 Introduction

The use of robo-advisors in the South African financial sector is a growing trend, with the potential for substantial growth in the insurance industry (Huneberg, 2020). These automated systems are designed to provide on-demand advice at a lower cost, potentially rendering human advisors obsolete. However, the impact of robo-advisors on investment decisions is not yet fully understood. Anthropomorphism and personalised anchors in recommendations have been found to increase investment volumes (Adam et al., 2019). Still, these systems' usability and user comprehension need further investigation, particularly in complex financial decision-making (Deo & Sontakke, 2021). Additionally, the role of robo-advisors in the behavioural finance of investors is a crucial area of study, with the potential to disrupt traditional financial services (Shanmuganathan, 2020). Having begun with the emergence of the internet, the Financial Sector has undergone several stages of digital transformation, including the Artificial Intelligence phase, which is believed to be transforming our lives and how things are done (OECD, 2019). As defined by Marvin Minsky, the father of AI, artificial intelligence is the ability of a machine to perform a specific task that humans consider intelligent. In their paper, Bryson, 2021) describes AI as the aptitude of computer programs to convey and communicate, excluding human involvement and intervention.

AI is used in many applications and different sectors, with the financial sector being one of the sectors where AI is applied (Casares, 2018). There are many financial sectors where AI is being implemented, including Banks, Financial Advisory, and Insurance (BFSI). This study will focus on Financial Advisory/ investments. Among the numerous applications, AI-driven robotic devices are increasingly employed in the hotel industry, aiming to supplement human tasks or replace human employees. With their ability to mimic human capabilities, AI-driven robotic devices hold the capacity to perform tasks traditionally carried out by humans (Lin et al., 2020)

AI adoption varies according to specific capabilities, and these applications are grouped into Customer-focused front-office applications, trading and portfolio management, operations-focused back-office applications and regulatory compliance (Atwal & Bryson, 2021). The ideas governing AI adoption include the integrity of recommendations, the complexity of tasks, the discrepancy between technology imported from elsewhere, and its suitability to the local context (Plantinga, 2022a).
Robo-advisors are one of the AI tools that are used in financial sectors to increase efficiency. Robo-advisory services were first introduced in the United States of America (USA). However, according to one market study, only 20% of investors are conscious of them, and only 3% are used regularly. One of the primary issues raised when discussing the application of information technology to various industries, including the financial markets, is investors' slow uptake of new services and platforms (Bhatia et al., 2020). Implementing AI tools not only automates tasks specific to requirements but also enhances analytical capabilities compared to conventional methods. Almost every business sector has been affected by automation and financial decisions are impacted by it (Bhatia et al., 2020).

In the workplace, Artificial Intelligence technologies are progressively replacing people's activities, obligations, and decision-making (Strich et al., 2021). Financial institutions have adopted technology implementation to provide efficient services to their clients and regain their confidence. (Koffi, 2016). Robo-advisors are an aspect of financial advisors who use algorithms to give automated investing recommendations (Bhatia et al., 2020) and enhance their efficacy.(Guo, 2020; Seiler & Fanenbruck, 2021). The increasing recognition of robo-advisors raises concerns about the quality of digital support (Tertilt & Scholz, n.d.)

Robo-Advisors aims to automate the process of obtaining advice on investing and executing investment transactions and improving the effectiveness of financial advisory services. They directly affect how customers feel or react and the financial viability of the services offered (Krista Hakala, 2019). Robo-advisors are similar to independent financial advisors, allowing clients to access various investment products, including decision-support management applications. This process of automation facilitates cost reduction and enhances decision-making. This research explores the implementation of

Robo-Advisors within the financial system to enhance decision-support management applications, exploring the possibilities and limitations that this technology can offer. It also critically examines the reliability of digitally aided administrative decision-making.

This study explores and investigates Robo-Advisors' potential to enhance Decision Support Management applications in South Africa's financial sector. The purpose of this study is to explore the factors that could have an impact on the acceptance of Robo-Advisors within the financial industry, to investigate the potential integration of Robo-Advisors into existing decision-support management systems, and examine the effects of Robo-Advisors on decision-making processes. The findings of this study can assist financial institutions in making well-informed decisions regarding adopting this technology. With AI techniques, financial BFSI can be more efficient, productive, cost-efficient and, most importantly, customer-satisfying. Financial institutions can make more profound decisions regarding implementing Robo-Advisors technology.

2   Research Design

The study conducted a systematic literature review using the Web of Science and Scopus databases. Figure 1 depicts the PRISMA flowchart diagram, which illustrates different Preferred Reporting Items for Systematic Meta-Analysis (PRISMA) screening processes.
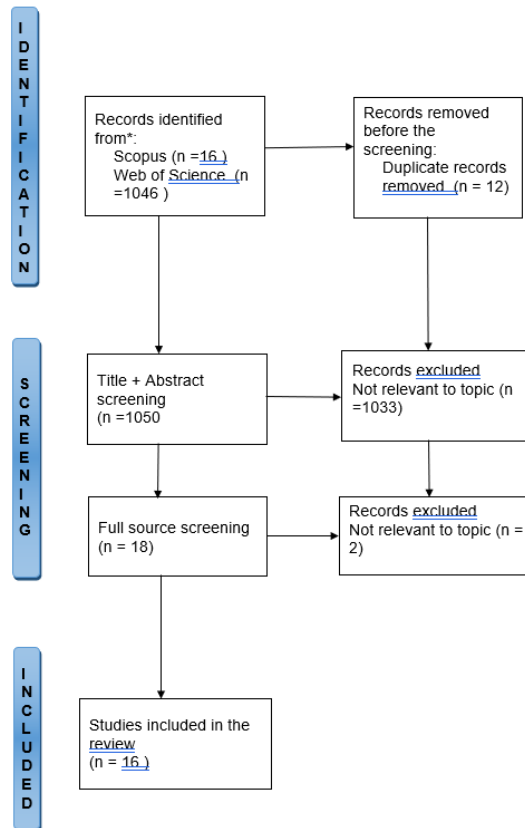

Figure 1: PRISMA Diagram showing the screening steps

The articles were obtained from the Web of Science and Scopus databases. It targeted papers discussing ROBO-ADVISORS IN A SOUTH AFRICAN FINANCIAL SECTOR between the years 2018 and 2023, using keywords "Artificial Intelligence" OR "Robo-advisors", "Digital Skills" OR "Decision Support Management", "Financial Sector" AND Employment" AND "South Africa. Seven additional publications were included through generic literature searches and snowballing, meeting inclusion criteria. All sixteen publications underwent inductive thematic analysis using NVIVO software.

3 Results and Discussions

The table provides a comprehensive summary derived from an in-depth analysis of sixteen publications focusing on the factors shaping the acceptance of robo-advisors within the financial sector. The analysis involved NVIVO software for an inductive thematic analysis. It aimed to uncover and understand critical themes, trends, and patterns related to adopting robo-advisors and their impact on decision-support management within South Africa's financial sector. Recurrent themes such as trust, data security, digital skill prerequisites, employment effects, and their influence on financial services were identified and explored, highlighting their significance and interconnectedness within the South African financial landscape context.

The findings grouped into three recurrent vital themes: the factors influencing Robo-Advisors' acceptance (lack of trust in AI and data security), the role of digital skills in implementation were identified and explored, highlighting their significance and interconnectedness within the context of the South African financial landscape, and these will be discussed below.

Themes	Summary	Key Findings	Key Challenges/Gaps	New Opportunities
Factors Influencing Robo-Advisors' Acceptance	Trust issues and customer attitudes present challenges; interventions for benefits clarification are needed to enhance trust and acceptance.	Lack of trust and data security are primary factors influencing adoption (Yi et al., 2023; Blanche et al., 2019; Mhlanga, 2021b; Shanmuganathan, 2020).	Trust building via transparent communication and consistent performance is challenging due to the absence of direct human interaction (Glikson & Woolley, 2020; Plantinga, 2022b).	Interventions highlighting benefits and mitigating concerns are crucial for increased trust and acceptance (Plantinga, 2022b; Nel & Boshoff, 2021).
	Overcoming resistance to change and addressing negative attitudes are crucial for successfully adopting and implementing robo-advisors in the financial sector.	Customers' negative attitudes towards digital-only banks hinder acceptance and implementation (Blanche et al., 2019; Nel & Boshoff, 2021).	Resistance to change and concerns about potential risks impact attitudes towards robo-advisors (Blanche et al., 2019; Nel & Boshoff, 2021).	Addressing negative attitudes and resistance is essential for successful adoption (Blanche et al., 2019; Nel & Boshoff, 2021).

	Addressing security concerns and maintaining transparent communication is pivotal for fostering trust and driving the adoption of robo-advisors.	Concerns over data security and privacy issues hinder acceptance (Mhlanga, 2022; Zhang et al., 2021).	Robust security measures and transparent communication are required to foster trust and acceptance (Mhlanga, 2020; Zhang et al., 2021).	Focus on security, privacy, and transparent communication for successful adoption (Mhlanga, 2022; Zhang et al., 2021).
The Role of Digital Skills in Implementation	Ongoing skill development is critical to address skill shortages and globalisation challenges in implementing robo-advisors in financial services.	Digital skills are vital for AI and machine learning implementation in financial services (Mangena & Mwalemba, 2023; Mhlanga, 2022).	Skill shortages and globalisation pose challenges in skill development (Landsberg & van den Berg, 2023).	Continuous skill development and training are essential for proficiency (Mhlanga, 2021a; Landsberg & van den Berg, 2023).
	Continuous skill development is essential to adapting to AI's changing landscape and addressing the lack of specialised skill development among recent graduates.	Continuous development of different models and algorithms is necessary due to AI's evolving nature (Mhlanga, 2021a; Tjebane et al., 2022).	The absence of specialised skill development for recent graduates is a concern (Tjebane et al., 2022).	Emphasis on continuous skill development and proficiency (Tjebane et al., 2022).
	Proficiency in various digital skills is crucial for successfully implementing robo-advisors, considering their user-friendly interfaces and diverse functionalities.	Robo-advisors offer a user-friendly interface for financial decision-making (Bhatia et al., 2020, 2021; Landsberg & van den Berg, 2023).	Proficiency in algorithm development, cybersecurity, and user experience design is crucial (Tjebane et al., 2022).	Emphasis on proficient skill development and software integration for successful implementation (Bhatia et al., 2020, 2021; Tjebane et al., 2022).
The Impact of Employment within Financial Advisory Services	Investment in learning and skill development is crucial to counter potential job implications due to automation and encourage the adoption of robo-advisors.	Financial knowledge positively influences the willingness to adopt robo-advisors (Yi et al., 2023; Van Rensburg et al., 2019).	Automation raises concerns about employment implications and skill development (Van Rensburg et al., 2019).	Investment in learning and skill development is recommended for increased employment prospects (Anakpo & Kollamparambil, 2022; Van Rensburg et al., 2019).

| | Investment in education and employment of financial professionals enhances the adoption and utilisation of robo-advisors, improving financial services. | Automation improves financial advisory services by reducing transaction costs (Van Rensburg et al., 2019; Mhlanga, 2021b). | Individuals with lower financial knowledge may require additional education to understand robo-advisors (Plantina, 2021). | Employing professionals in financial advisory services influences adoption and utilisation (Sabir et al., 2023; Yi et al., 2023). |

Table 1: Summary of themes

3.1 Factors Influencing The Robo-Advisors' Acceptance.

Adopting robo-advisors hinges significantly on two primary factors: lack of trust and data security (Yi et al., 2023). Concerns arise from potential risks associated with AI algorithms, raising doubts about the trustworthiness and reliability of decisions made by AI-powered systems, which, in turn, impact the acceptance of robo-advisors (Belanche et al., 2019; Mhlanga, 2021b; Shanmuganathan, 2020). The advent of the fourth industrial revolution has escalated the urgency to scrutinise the efficacy of AI models in tackling financial hurdles (Dube et al., 2023).

3.1.1 Lack Of Trust

Trust is a fundamental element in the adoption dynamics of financial robo-advisors and AI services, as users inherently seek reliability, security, and confidence in the system (Mhlanga, 2022; Yi et al., 2023). In addition, the absence of direct human interaction poses challenges in building social rapport, making trust cultivation crucial through transparent communication and consistent performance (Glikson & Woolley, 2020; Plantinga, 2022b). New technologies' perceived utility and risks influence users' adoption decisions, necessitating interventions to highlight benefits and mitigate potential concerns (Plantinga, 2022b). Trust is a pivotal factor in shaping users' intentions to adopt novel financial technologies, with a positive correlation between perceived effectiveness and increased adoption likelihood (Shanmuganathan, 2020). The mismatch between imported technology platforms and local working practices often results in low adoption rates and reduced motivation among civil servants. The literature also highlights customers/consumers' pessimistic attitude toward digital-only banks. This negative perception can hinder the acceptance, adoption and implementation of robo-advisors (Nel & Boshoff, 2021). Factors such as resistance to change from traditional banking methods and concerns about potential risks affect consumers' attitudes (Nel & Boshoff, 2021). They should be addressed so that robo-advisers can be adopted.

3.1.2 Data Security

The reviewed literature highlights concerns regarding the security of data utilised and processed by robo-advisors, highlighting the importance of robust data security procedures (Mhlanga, 2022; Zhang et al., 2021). Security, particularly in safeguarding financial data during transmission and storage, requires robust cybersecurity measures and transparent communication. As robo-advisory services become more prevalent, familiarity contributes to increased acceptance, emphasising the importance of transparent communication, robust security, and the fulfilment of user expectations in fostering trust and driving widespread adoption (Mhlanga, 2020; Yi et al., 2023). The literature also highlights

customers/consumers' pessimistic attitude toward digital-only banks. Attitude is the strongest predictor of behavioural intention to use financial robo-advisors (Blanche et al., 2019). This negative perception can hinder the acceptance, adoption and implementation of robo-advisors (Blanche et al., 2019; Nel & Boshoff, 2021). Factors such as resistance to change from traditional banking methods and concerns about potential risks affect consumers' attitudes (Nel & Boshoff, 2021). They should be addressed so that robo-advisers can be adopted.

3.2 The Role of Digital Skills in Implementation

The literature highlights the importance of digital skills in implementing AI and machine learning in financial services. It emphasises the need for knowledge in assessing these technologies and the continuous development of different models and algorithms (Mangena & Mwalemba, 2023; Mhlanga, 2022). Functional barriers, such as perceived benefits and ease of use, can influence digital-only institutions. The ever-changing nature of AI in the banking industry necessitates the continuous development of different models and algorithms, focusing on the importance of digital skills (Mhlanga, 2021a). Digital skills in implementing robo-advisors are crucial in the evolving financial services. The Fourth Industrial Revolution (4IR) and technological advancements have transformed the business landscape.

Developing countries face skill shortages, globalisation, and technological advancements (Landsberg & van den Berg, 2023). According to (Tjebane et al., 2022), as the banking and financial industry faces increased competition, there is a growing emphasis on leveraging technology. The absence of specialised skill development for recent graduates requires immediate attention.

Robo-advisors offer a streamlined and user-friendly interface for financial decision-making (Bhatia et al., 2020, 2021). Digital skills are crucial in algorithm development, programming, cybersecurity, and user experience design (Tjebane et al., 2022). Software development and integration proficiency are required for integrating robo-advisors into existing financial systems. Digital skills also provide training and support to financial professionals and end-users, ensuring the effective use of robo-advisor platforms.

In conclusion, digital skills are integral to the entire lifecycle of robo-advisor implementation, reflecting the critical role of technological proficiency in shaping the future of financial services.

3.3 The Impact of Employment Within Financial Advisory Services

The literature reviews the positive relationship between financial knowledge and people's willingness to adopt robo-advisors, contrasting with prior research (Yi et al., 2023). The automation process in financial advisory services has significant implications for employment, socio-economic issues, and skills development. Artificial intelligence (AI) imitates human intelligence through mathematical models, improving financial advisory services (Van Rensburg et al., 2019). Technological development is a crucial driver for new growth and a means to develop and outperform global competitors (Van Rensburg et al., 2019). The reviewed literature predominantly emphasises the progress of artificial intelligence in imitating human intelligence via mathematical models, which implies improvements in financial advisory services. (Mhlanga, 2021b). When robot advisors are fully implemented, they tend to reduce transaction costs, overcome asymmetry, and provide affordable financial services to underserved populations (Mhlanga, 2021b)

The impact of employment within financial advisory services is significant in the context of robo-advisory adoption; as per Plantina (2021), individuals with lower financial knowledge may require additional education and resources to understand how robo-advisors work and their potential benefits.

Proper investment in learning and skill development training is recommended to increase the prospect of employment (Anakpo & Kollamparambil, 2022). Professionals in financial advisory services, such as financial advisors and consultants, play a crucial role in educating and guiding individuals on the use and benefits of robo-advisory services. Their expertise can enhance financial knowledge and build trust in the technology, ultimately influencing the willingness to adopt robo-advisory services (Sabir et al., 2023). Employing professionals within financial advisory services plays a crucial role in influencing the adoption and utilisation of robo-advisory services, particularly in enhancing financial knowledge and providing personalised guidance (Yi et al., 2023).

4   Conclusion

The conclusion draws attention to the pivotal factors influencing the adoption of robo-advisors within the South African financial sector, highlighting the significance of financial literacy, trust, and perceived usability in shaping individuals' inclination toward adopting these technologies. It emphasises the importance of enhancing financial literacy and establishing trust through transparent information and user-friendly interfaces. Moreover, the study forecasts a significant change in customers' attitudes towards AI devices in the future, warranting further investigation (Lin et al., 2020). The evolution of robo-advisory services in South Africa, observed mainly during the COVID-19 crisis, suggests a transition from early adoption to early majority phases, indicating increased awareness and acceptance. Additionally, the study underscores the significance of digital skills encompassing financial knowledge, usability, and trust-building in influencing the impact of robo-advisors on employment within financial advisory services. The research also sheds light on the influence of customers' emotions on their behavioural intention to use AI devices, revealing a negative correlation between willingness and objection toward AI devices, suggesting their coexistence. However, it acknowledges limitations owing to the rapid evolution of AI technology, emphasising the necessity for future research to reevaluate customer attitudes and formulate new theoretical models (Lin et al., 2020). Furthermore, while certain relationships lacked significance in the study, it underscores the context-dependent nature of customer acceptance behaviour, urging further validation in diverse contexts. Future studies are recommended to revisit customer acceptance behaviour concerning AI devices, continually evolving alongside the advancements in AI technology, to comprehensively understand adoption patterns and refine theoretical models that explain this evolving behaviour (Lin et al., 2020).

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