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MEASURING THE USE OF ROBO-ADVISORS: A VALIDATED SCALE FOR MALAYSIAN INVESTORS

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Abstract:

The emergence of digital investment platforms, especially robo-advisors, has transformed the financial industry by delivering cost-effective, accessible, and data-driven investment services. However, despite these benefits, the adoption of robo-advisors in Malaysia remains lower compared to global benchmarks. This study aims to assess the validity and reliability of an instrument measuring behavioural intention to use robo-advisors in the Malaysian context. The instrument underwent a rigorous validation process involving seven panel experts who assessed the measurement items for face and content validity. Content Validity Ratio (CVR) and Content Validity Index (CVI) were employed to evaluate expert consensus and guide item refinement. For reliability, analyses included internal consistency, factor loadings, and convergent validity. The final instrument consists of five items using a 5-point Likert scale and 30 items using a 7-point Likert scale, covering six key variables. This tool provides a solid framework for understanding adoption barriers and identifying growth opportunities for robo-advisors in Malaysia. The validated instrument is reliable for use in actual data collection and offers significant contributions to both academic research and industry application. It also strengthens the theoretical foundation of fintech adoption in emerging markets through comprehensive psychometric evaluation. Ultimately, the study delivers a pragmatic and context-specific tool for assessing behavioural intention in robo-advisor usage.

Keywords:

Instrument Development, Questionnaire Development, Content Validity, Robo-Advisors.

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Introduction

Robo-advisors represent a notable advancement in Malaysia's financial sector, aligning with the Sustainable Development Goals (SDGs) by promoting economic inclusivity and enhancing financial literacy (Nazmi et al., 2024). Robo-advisors, as digital investment platforms, utilize algorithms to provide economical, accessible, and personalized investment guidance, facilitating wealth creation for Malaysians from diverse origins (Kuah et al., 2024). This innovation explicitly promotes SDG 8 (Decent Work and Economic Growth) by fostering sustainable financial growth through cost-effective investment solutions and SDG 10 (Reduced Inequalities) by eliminating traditional barriers to financial services, thus enabling broader socioeconomic participation. Platforms like StashAway, Wahed Invest, and MyTheo dominate the industry by offering portfolios that include sustainable investment options (Nguyen et al., 2023). The expansion of robo-advisors can significantly enhance financial inclusion and contribute to attaining the SDGs, positioning Malaysia as a leader in sustainable and inclusive financial technology (Faradynawati & Söderberg, 2022). However, the main issue is the insufficient of financial literacy and concerns around specific aspects of digital investing (Nazmi et al., 2024). Therefore, there is a need to study the adoption factors of the intention to use robo-advisors and to utilize and embrace digital investing in Malaysia.

The reliability and validity of the items employed to evaluate the factors of the behavioural intention to use robo-advisors are crucial. Multiple studies in Malaysia have examined the relationship between financial literacy and an individual's likelihood of using robo-advisors (Hadi et al., 2023)Therefore, this study's objective is to evaluate the validity and reliability of factors influencing the use of robo-advisors among Malaysian investors. More statistical analyses are proposed to validate the instruments.

Limited research has been conducted to examine how specific criteria, such as financial literacy and an individual's demographic characteristics, influence their intention to utilize digital or automated investment (Hadi et al., 2023; Wang et al., 2023). Thus, this research aims to verify a valid instrument for assessing the behavioural intention to use robo-advisors, especially in the Malaysian investor context.

Literature Review

The rise of robo-advisory services has garnered considerable interest recently due to the advent of artificial intelligence (AI) and heightened awareness of personal financial management (Chen et al., 2025; Kamarudin et al., 2025; Nazmi et al., 2024). Various studies have investigated the determinants affecting an individual's decision to use robo-advisors as an alternative investment platform (Kuah et al., 2024). A systematic literature review conducted by Manaf et al. (2023) identified the determinants influencing the adoption of digital financial advising services. Sani and Koesrindartoto (2019) utilized the Technology Acceptance Model (TAM) to determine the primary factor influencing university students' acceptance of robo-advisors. Likewise, research conducted by Atwal and Bryson (2021), Figà-Talamanca et al. (2022), and Seiler and Fanenbruck (2021) reveals essential antecedents influencing the intention to utilize robo-advisors from the viewpoints of German private investors and Italian university personnel. Sabir et al. (2023) conducted a study to examine users' perceptions toward the use of robo-advisors among prospective investors in China.

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The study by Kuah et al. (2024), Wu and Gao (2021), and Yeh et al. (2022), which adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) in their study in Malaysia and China, showed significant effects of factors such as performance expectancy, effort expectancy, social influence, habit, and hedonic motivation on the adoption of robo-advisors. Gan et al. (2021) reported different results, revealing that effort expectancy and facilitating conditions are not significant in determining the adoption intention of robo-advisors. Thus, based on the assessment of preceding studies, this study has identified variables that will be used in examining the current study, especially in the Malaysian investment landscape.

Researchers can obtain critical insights by performing a content validity study (Rubio et al., 2003). Employing a panel of experts yields feedback and comments regarding the newly designed measure and establishes objective standards for evaluating each item. The subject experts are specialists with published work or experience in the topic, which will assist in assessing the measure's construction and its appropriateness for psychometric testing (Rubio et al., 2003).

Table 1: Summary of Intention to Use Research Using UTAUT Model

Key Factors	Key Findings	Literature Support
Performance expectancy	The results show a positive relationship between performance expectancy and behavioural intention in using fintech platforms, such as robo-advisors, digital payment and pension investments, mobile money services, and blockchain.	Chao (2019); Rühr et al. (2019); Aseng (2020); Senyo & Osabutey (2020); Chan et al. (2022); Eren (2023); Kumari et al. (2023); Roh et al. (2023); Kuah et al. (2024)
Effort expectancy	A positive relationship exists between effort expectancy and the intention to use fintech platforms, including digital payment services, cryptocurrencies, open banking, PayLater apps, and wearable payment devices.	Aseng (2020); Senyo & Osabutey (2020); Rabaa'i & Zhu (2021); Chan et al. (2022); Phuong et al. (2022); Alomari & Abdullah (2023); Recskó & Aranyoss (2024); Srivastava et al. (2024)
Social influence	A positive relationship exists between social influence and the intention to use fintech platforms, including digital payment services, cryptocurrencies, open banking, PayLater apps, and wearable payment devices.	Aseng (2020); Rabaa'i & Zhu (2021); Chan et al. (2022); Phuong et al. (2022); Alomari & Abdullah (2023); Kumari et al. (2023); Rahim et al. (2023)
Facilitating conditions	Facilitating conditions impact both the intention and adoption of robo-advisors. Supportive settings have a beneficial influence on the behavioural intention related to the technical infrastructure.	Gan et al. (2021); Yeh et al. (2022); Roh et al. (2023)
Financial literacy	There is positive significant relationship between financial literacy and intention to use of certain financial technologies such as open banking, e-loyalty, cryptocurrency, and digital payment.	Chan et al. (2022), e-loyalty (Alkhwaldi et al., 2022), cryptocurrency (Alomari & Abdullah, 2023; Kumari et al., 2023), digital payment

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		(Nur & Azzahra, 2023; Srivastava et al., 2024),

The UTAUT model has been selected as the primary theoretical framework for this study due to its robustness and parsimony. UTAUT is widely utilized because of its strong and succinct characteristics (Venkatesh et al., 2012) and has been validated as a dependable theoretical instrument for forecasting individual usage behavior (Alkhwaldi et al., 2022). However, this study also extends the UTAUT to include financial literacy as an additional construct.

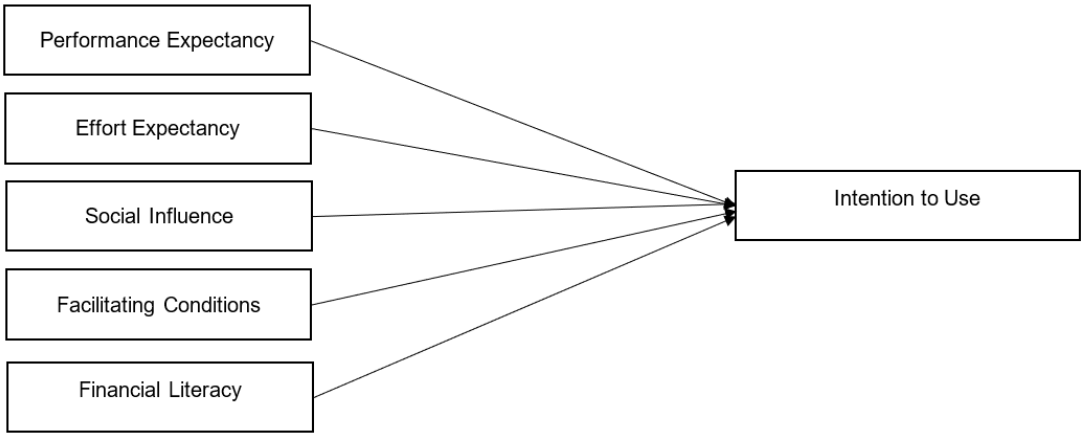

Figure 1. Theoretical Framework

Methodology

This research employs the methodology established by Amron et al. (2020) to create and validate a tool. The process encompasses three primary phases: (i) instrument development, (ii) instrument validity, and (iii) pilot study. The initial phase involves designing and developing the instrument, grounded in literature research, preliminary studies, and relevant reports. The theme analysis evaluated the Unified Theory of Acceptance and Use of Technology (UTAUT) as the basis for variable selection in this study. The subsequent consideration is the instrument validity. This step encompasses two validation procedures: face validity and content validity. The concluding step in assessing the dependability of this study involves executing a pilot study to finalize the validity and reliability evaluation of the measurement items.

Instrument Development

The items consist of eight sections: (A) Demographic Profile, (B) Performance Expectancy, (C) Effort Expectancy, (D) Social Influence, (E) Facilitating Conditions, (F) Financial Literacy, and (G) Behavioural Intention. The initial questionnaire comprised six constructs and 35 measurement items. The constructs and items are performance expectancy (6 items), effort expectancy (6 items), social influence (6 items), facilitating conditions (6 items), financial literacy (5 items), and behavioural intention (5 items).

Six items have also been added to the demographic profile. This study utilized the Likert scale method to assess the items in the survey. The Likert scale for the behavioural intention construct uses a five-point Likert scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree". While the items for performance expectancy, effort expectancy, social influence, facilitating conditions, and financial literacy have been evaluated

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using a seven-point Likert scale, which are 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neutral, 5 = somewhat agree, 6 = agree, and 7 = strongly agree. Varying the scale types to the extent that it is conceptually appropriate and to increase the motivation to respond accurately (Podsakoff et al., 2012).

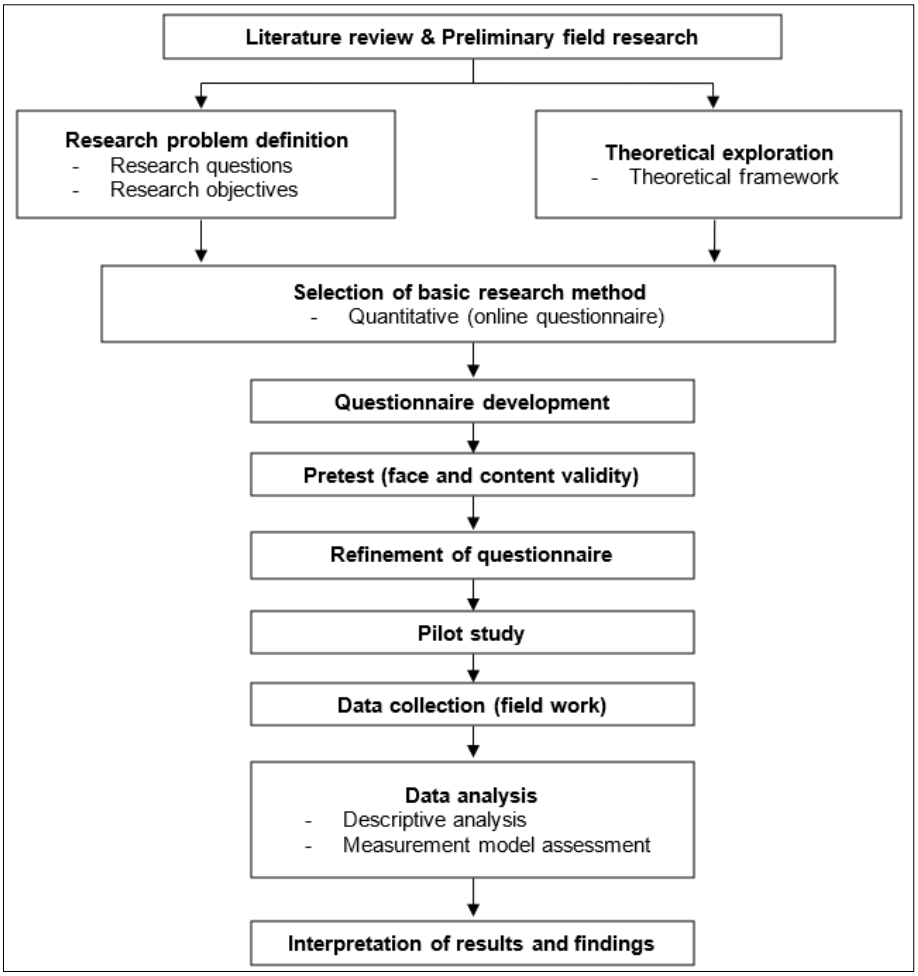

Figure 2: Quantitative Research Method

Face Validity of the Questionnaire

Face validity pertains to the degree to which a measurement appears to be related to a specific notion, as evaluated by non-experts, including test-takers and legal representatives (Taherdoost, 2016). A panel of experts will meticulously assess the amended questionnaires to determine their face validity (Hulland et al., 2017). Furthermore, the instruments are pretested by experts to verify that they are clear, simple, and satisfy appropriate psychometric standards (Hulland et al., 2017). Before the official survey administration, the process of refining the survey questions was a pre-testing procedure, which is crucial for finding inadequacies in the questions and reducing biases (Bougie & Sekaran, 2020; Memon et al., 2020). This study has engaged three specialists with varied backgrounds in financial businesses, experienced investors, and proficiency in the language to evaluate the items.

Expert Content Validity of the Questionnaire

This study utilizes the content validity assessment established by McKenzie et al. (1999), performed by experts to validate the instrument. This corresponds with a study by Kennedy et

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al. (2019), which suggested that a panel of five to ten experts is adequate for assessing the measuring items. Consequently, this study has selected seven content experts for the content validity assessment based on their proficiency, educational qualifications, areas of interest, experiences, and competencies in robo-advisors, finance research, survey instrument construction, and statistical analysis. Experts have been requested to assess the relevance and clarity of each item by assigning a rating on a four-point scale: 1 = Not relevant/Not clear, 2 = Somewhat relevant/Somewhat clear, 3 = Quite relevant/Quite clear, and 4 = Highly relevant/Very clear. Moreover, experts have been requested to offer recommendations or insights into the measurement of the structures.

Simultaneously, quantitative analysis techniques entails calculating the content validity ratio (CVR) and content validity index (CVI) to evaluate the validity of survey items (Taherdoost, 2016). CVR is a statistical metric that signifies the extent to which the measurement items effectively ascertain their acceptance or rejection. CVR and CVI offer accuracy regarding both cost and time, and they can be executed swiftly and effectively (Tojib & Sugianto, 2006). Later, the CVR was calculated for each measurement item using the CVR calculation formula [(Ne-N/2)/(N/2)], based on the scale suggested by Lawshe (1975), which indicates that 1 = Not necessary, 2 = Important but not essential, and 3 = Essential. Thus, the calculation measures the value Ne as the number of experts indicating 'relevant' or 'essential' (scores of 2 and 3), and the value N is the total number of experts. In addition, experts have provided input indicating the necessity to enhance phrasing, separate double-barreled questions, and eliminate duplicate or overlapping questions.

Pilot Study

A pilot study must be performed before the main investigation to verify the appropriateness of the instruments for the actual research (Safiyuddin et al., 2023). Furthermore, the outcomes of this pilot study can inform the development of questionnaire items before the commencement of the primary investigation. The pilot study in this research involved 30 respondents and had two primary objectives. The primary aim is to enhance the quality of questions. The second objective was to assess the respondents' comprehension and elucidate the survey administered (Saunders et al., 2009). The assessments data analysis techniques are based on composite reliability (CR > 0.7), indicator loadings (> 0.708), and average variance extracted (AVE > 0.5), as suggested by Hair et al. (2017, 2019, 2022).

Results and Discussion

Based on the total number of experts, which is seven, a minimum CVR of 0.99 is required to accept the measurement item to be retained in the survey (Lawshe, 1975) as in Figure 3, while the CVI value in this study is based on the seven experts, which is 1.00, as suggested by Lynn (1986) as shown in Table 2.

No. of Panelists	Min Value
5	0.99
6	0.99
7	0.99

Figure 3: CVR Minimum Value

Source: Lawshe (1975)

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Table 2: CVI of The Survey Instrument

Construct	Number of initial items	Number of accepted items	CVI
Performance expectancy	6	6	1.00
Effort expectancy	6	6	1.00
Social influence	6	6	1.00
Facilitating conditions	6	6	1.00
Financial literacy	6	6	1.00
Intention to use	6	5	1.00
		Overall CVI	1.00

Source: Self-calculated

Table 3 displays the assessments of the measurement model for factor loadings, composite reliability (CR), and average variance extracted (AVE). The purpose of assessing the measurement model is to check for the reliability of the questionnaires. From the results, all loadings are acceptable, ranging from 0.627 to 0.967, which exceeds the threshold value 0.708. The CR value, the results are acceptable, ranging from 0.903 to 0.976, which exceeds the threshold value of 0.7. Furthermore, all the AVE values exceed the threshold value of 0.5, ranging from 0.613 to 0.873.

Table 3: Measurement Model For The Pilot Study

Construct	Items	Loadings	CR	CR
Intention to use	BI1	0.897	0.963	0.840
	BI2	0.960		
	BI3	0.880		
	BI4	0.921		
	BI5	0.922		
Performance expectancy	PE1	0.867	0.947	0.748
	PE2	0.868		
	PE3	0.852		
	PE4	0.863		
	PE5	0.869		
	PE6	0.872		
Effort expectancy	EE1	0.855	0.969	0.838
	EE2	0.941		
	EE3	0.967		
	EE4	0.939		
	EE5	0.932		
	EE6	0.854		
Social influence	SI1	0.627	0.903	0.613
	SI2	0.926		
	SI3	0.846		
	SI4	0.847		
	SI5	0.763		
	SI6	0.644		

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Facilitating conditions	FC1	0.940	0.976	0.873
	FC2	0.943		
	FC3	0.967		
	FC4	0.954		
	FC5	0.884		
	FC6	0.917		
Financial literacy	FL1	0.758	0.955	0.781
	FL2	0.897		
	FL3	0.949		
	FL4	0.898		
	FL5	0.894		
	FL6	0.896		

Source: Self-calculated

Conclusion

This study has achieved its main objective, which is to confirm and verify a valid instrument for assessing the behavioural intention to use robo-advisors, especially in the Malaysian investor context. This study has progressed through several steps to evaluate the reliability and validity of each proposed variable and item, utilizing question formulations grounded in prior research and expert validation. The analysis of the content validity ratio, content validity index, composite reliability, indicator loadings, and average variance extracted was used to verify the relevant and essential items for each construct. The novel instrument has demonstrated satisfactory measurement performance, which is necessary for a forthcoming descriptive study to evaluate the behavioural intention to use robo-advisors among Malaysian investors. The survey has shown sufficient validity and reliability, allowing further arrangements to proceed with the actual data collection and analysis. Thus, these questionnaires are valid and reliable for evaluation in the final survey.

This study also suggested extending the scope to include other financial technology platforms, such as mobile banking, peer-to-peer lending, and blockchain-based services, to assess whether the validated instruments maintain their reliability and relevance across diverse fintech environments. Additionally, expanding the geographical coverage of respondents beyond the current sample will allow for cross-cultural comparisons and enhance the generalizability of the findings. Such extensions can offer deeper insights into user behaviour and improve the applicability of the model in varied financial ecosystems.

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