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Conceptual Model of Technology Acceptance Model Modification on Robo Advisor Acceptance in Indonesia

Arief Fahruri[1], Mohammad Hamsal[2], Asnan Furinto[3], Rano Kartono[4]
Universitas Bina Nusantara[1,2,3,4]
K. H. Syahdan No. 9, Kemanggisan, Palmerah
Jakarta 11480 Indonesia
Corresponding Email: arief.fahruri@binus.ac.id
ORCHID ID: 0000-0002-5205-1665

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ABSTRACT

The success factor in implementing new technology is the acceptance and use of the technology by users. Indonesia is a country with significant investor growth since 2018 with the presence of technology that makes it easier to open accounts and online transactions. Is the presence of Robo advisor technology in investment products also expected to be acceptable like existing online investment applications? This paper provides a conceptual TAM model by adding UI/UX and Security as the driver of Perceived Usefulness (PU) and Perceived Ease of Use (PEU). We also add Trust and Expected Return variables related to financial variables. So that the proposed model can be used as a basis for empirical research in the future to validate the context of accepting Robo advisors in Indonesia.

Keywords: UI & UX, Security, Trust, Expected Return, Intention to Use, Actual Use.

INTRODUCTION

In the 4.0 era, the technology change in any area includes fintech such as digital investment called Robo advisor. It's often positioned to benefit people who are less literate with investments products, with capabilities to automatically make investment decisions without minimizing knowledge about how portfolios underlying and details are built (Hohenberger et al., 2019). Robo advisor is the software in use algorithm that gives a recommended investment product based on the risk profile (Moulliet et al., 2016) (Abraham et al., 2019) (Salo & Haapio, 2017). Thus, this technology provides a simplifiedprocess to customers as Investors in invest their money without their analysis.

In Indonesia, the regulator issued the OJK infinity to accommodate rapid technology and build a fintech ecosystem as a part national financial system that contributes to the public (Santoso, 2018). Robo advisor includes in the clustering of regulation, even an existing player who has another license such as a Mutual selling agent offers the Robo advisor model to the customers (*Robo-Advisor @ www.bareksa.com*, n.d.). The underlying Robo advisor that is offered is a mutual fund that divides into conservative, moderate, and aggressive risk profiles. Some players who provide Robo advisor such as Bareksa and Bibit despite selling the mutual product like a market place also add the services of Robo advisor.

Much research in the acceptance and adoption of technology use is based on the applied theory Technology acceptance model (TAM) which have developed in 1985 by (F D Davis, 1985), modified the first TAM (Fred D. Davis et al., 1989), Final version of TAM (Venkatesh & Davis, 1996), TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008). The main factors are Perceived usefulness (PU) & Perceived ease of use (PEU) consistent use of the theory. Some researchers extended the external variable of the original TAM such as (Lai, 2017) that extended the security variable in the e-payment context, (B.U. et al., 2021) extend the Trust variable in the e-payment platform.

Robo advisor is a different context as the technology tools that support to make decision-making of investments without humans. It's also a very sensitive term about transaction data and the amount of investment so that may need good data security to avoid theft of personal data on mobile apps. In this case, almost 280 million data is tradable (katadata, 2020). Consumers also may be concerned about UI and UX as a dimension that affects PU and PEU then in the end accept the Robo advisor technology. Trust is an important term in the financial business. Holding a license by some regulator may be the variable that affected the customers to intention use Robo advisor. In addition, the expected return is possible to have a direct effect on the acceptance of the Robo advisor. The customer may expect in using a Robo advisor will give more returns than a human advisor.

This paper proposed a conceptual model of a modified Original Technology Acceptance Model (TAM), to understand factors that influence user acceptance of Robo advisor.

a. Does UI&UX affects Perceived Usefulness and Perceived Ease of Use?

b. Does Security affect Perceived Usefulness and Perceived Ease of Use?
c. Does Trust have a direct effect on the behavioral intention of user Robo Advisor?
d. Does Expected return directly affect behavioral intention on user Robo Advisor?

LITERATURE REVIEW

Robo Advisor Technology

(Moulliet et al., 2016) define Robo Advisor divided by the words "Robo" (robotic) and "Advisor". "Robo" is the automatic process without humans, using a mathematical algorithm to support make decision-making in investment. Whereas "Advisor" is a Wealth Management service automatically through an online channel. Robo advisor relates to investment product recommendation advice service in wealth management using technology.

Practically, Robo advisor is software that proposes some questions about the condition and investor financial goals then based on the answers, the algorithm will give some investment products (Salo & Haapio, 2017), based on the investor risk profile (Abraham et al., 2019). In its development, Robo advisors can adjust for many financial goals such as education savings, home purchase planning, retirement, protection needs, and inheritance (Accenture, 2015) (Abraham et al., 2019). In short, the Robo advisor starts by giving several questions that must be answered, and these answers will identify the investor's risk profile then will be given investment products that are by the risk profile.

Robo advisor continues to evolve in line with technological developments and regulatory support, especially in Indonesia. (Moulliet et al., 2016) divides the evolution of Robo Advisor into four stages from 1.0 to 4.0. Stage 1.0 Robo advisors use web/ mobile apps to give online questionnaires and the product ETFs, bonds, and shares. The stage is very limited just propose the recommendation in the first after completing the question. Stage 2.0 and 3.0 add a rebalancing and adjustment in management by dedicated fund management. Stage 4.0 is the advanced evolution that is a real-time fully automated investment and asset shift by the self-learning algorithm. Referring to this evolution, the stage of the evolution of Robo advisors in Indonesia is still at level 1.0. some robot advisor service providers operate under mutual fund selling agent licenses. They provide mutual fund product recommendations from several investment managers' companies (e.g Bareksa.com, bibit. id). Arguably, the development of Robo advisors will reach level 4.0 in developing countries such as Indonesia. high internet growth and low financial literacy in the capital market sector provide opportunities for the growth of new technology and factors such as UI & UX (Lai, 2017) in e-payment adoption, trust (B.U. et al., 2021) (Bhatia et al., 2021) (Gan et al., 2021) (Hildebrand & Bergner, 2021), security (Lai, 2017) (Bhatia et al., 2021), cost (Bhatia et al., 2021), expected return (Tao et al., 2021) are considered in investors' decisions in adopting new technology in the context of Robo advisors.

Technology Acceptance Model Theory

The journal title "*Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research"* by (Fishbein and Ajzen,1975) is the trigger of the theory technology acceptance models by (F D Davis, 1985) in his dissertation proposal. It's a popular theory used

regarding the factors that determine a person's behavioral intentions are influenced by two factors, namely: “Attitude “and “Subjective Norm”.

The chronological TAM theory

Author	Title	Summary
(Fishbein and Ajzen,1975)	*Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*	Is a popular theory used regarding the factors that determine a person's behavioral intentions are influenced by 2 factors, namely: Attitude and Subjective Norm
(F D Davis, 1985)	*A technology acceptance model for empirically testing new end-user information systems: Theory and results.*	The TAM theory is a Doctoral proposal by Fred Davis. This theory is adapted from the theory of Reasonable Action (TRA) (Fishbein and Ajzen,1975). TAM is specifically adapted to the acceptance model of information systems/technology. Two main factors that influence the use of technology are Perceived Usefulness (PU) and Perceived Ease of Use (PEU), which are the originals of TAM theory.
(Davis, Bogozzi, Warshaw, 1989)	*Use Acceptance of Computer Technology: A comparison of two theoretical models*	The first modification of the TAM theory includes external variables as factors that might affect Perceived Usefulness (PU) and Perceived Ease of Use (PEU).
(Venkatesh & Davis, 1996)	*A model of the antecedents of perceived ease of use: Development and test*	This is the final version of TAM which the main results of Perceived Usefulness (PU) and Perceived Ese of Use (PEU) have a direct influence on behavioral intentions (behavioral intention) using technology
(Venkatesh & Davis, 2000)	*A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies.*	Known as TAM2 it explains in detail the reasons users use the technology in 3 stages of time: pre-implementation, one month after implementation, and three months after implementation. The external variables added in TAM2 are Image, Job relevance, Output quality, Result Demonstrability. Experiences and Voluntariness moderate the Subjective Norm. factor
(Venkatesh & Bala, 2008)	*Technology Acceptance Model 3 and a Research Agenda on Interventions*	TAM3 theory is a combination of TAM2 and model theory of the determinants of perceived ease of use (Venkatesh, 2000). TAM3 uses four types of factors: individual differences, system characteristics, social influence, and

		facilitating conditions which are determinants of Perceived Usefulness and Perceived Ease of Use. The TAM3 research model is tested in the real world in an IT implementation setting.

PROPOSE A CONCEPTUAL MODEL

a. Perceived Usefulness (PU) & Perceived Ease of Use (PEU)

Perceived usefulness is the degree to of a person believes that using a certain system (technology) will be able to improve performance. (Thompson et al., 1991) explained that individuals will use information systems/technology if they have a good understanding of the benefits or usefulness of their uses. Perceived Ease of Use provides user confidence that the information system/technology to be applied is an easy matter and does not become a burden. Information technology that is not difficult to use will continue to be applied by the company. (Fred D. Davis, 1989) explain that the perspective of perceived ease of use is a level of a person who believes that the use of a particular system can reduce a person's effort in doing something. The system used more often indicates that the system is better known, easier to operate, and easier to use by the user.

b. UI/UX

(Lai, 2017) explained on the study case of e-payment in Malaysia that not specifically mention UI/UX but as design exogenous variable of the apps has positively associated on perceived of usefulness (PU) and Perceived Ease of Use (PEU). (Seiler & Fanenbruck, 2021) on the research of intended use, Robo advisor in Germany explained the impact of User Interface as a Design variable. The research uses the TAM3 theory that contains the image as a trigger effect to perceived usefulness (PU). UI and UX are related to appearance and comfortable satisfied a customer in using the Apps. It's including of layout, animation, visuals, themes, and keyboard on the Apps. More interesting UI and UX create usefulness and ease of use of the technology acceptance.

c. Security

(Lai, 2017) add the security variable on the literature study as a stimulus of Perceived Usefulness (PU) and Perceived Ease of Use (PEU) as the main TAM theory variable. (Bhatia et al., 2021) Qualitative research asks how confident the investors are about the security of financial data when it comes to machines (Robo-advisor). The result finds that the data security variable has the factors that affect the perception of the investor to use Robo-advisor (Bhatia et al., 2021). The security proposed in this framework paper related to the data privacy of users if using the platform of Robo-

advisor includes ID and transaction. This relates to the most case of data privacy in Indonesia such as in E-commerce and Online lending.

d. Trust

(Siau & Wang, 2018) detailed the factor to lead trust in an Information system is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor. (B.U. et al., 2021) In the conceptual paper add the trust to the modified TAM theory with three dimensions of trust: First, the “Integrity” the definition is the trustor’s perception that the trustee will adhere to a set of principles are ones that the trustor finds acceptable. The second one is “Benevolence” which is the subjective assessment that the firm provides ultimate benefits, Third, “Ability” is the group of skills, competencies, and characteristics that enable a party to influence within some specific domain. (Bhatia et al., 2021) do a qualitative study to gauge the awareness and perception of Indian individual investors about the new fintech innovation Robo-advisor. The research finds that Trust is one of the factors that impact the perceptions of investors. In addition (Gan et al., 2021) found that trust has a significant to the adoption of Robo-advisor in the outbreak of Covid-19 in Malaysia using the UTAUT model. Trust variable in this conceptual paper proposed is the licensing by the regulator that has by the company. Most of the cases by fintech in Indonesia do not have the licensing but have more users. It’s interesting to understand the trust matter proposed in this conceptual paper.

e. Expected Return

Robo-advisor is related to the strategy of asset allocation to pursue an optimal investment without human intervention. Most the Robo advisor methodology provider uses the Modern Portfolio Model in creating the portfolio allocation. (Markowitz, 1952) explain the model risk and return and the relationship. The framework led to the concept of efficient portfolios which are expected to yield the highest return for a given level of risk. (Tao et al., 2021) on his research showing that Robo advisor outperforms some S&P Index, DJIA, Nasdaq, equity funds, fixed income, money market, and hybrid funds in US Market. The expected return is related to financial and investment matters but very rare add-on adoption theory in technology Robo advisor. This paper proposed this variable as the factor that will affect the intended use of Robo advisor technology in Indonesia.

f. Intention to Use

The Information System researcher has suggested that the intention model or behavior decision support by social psychology can deliver the basis of IT adoption research by organizations and individuals (Harrison et al., 1997). It is a behavioral tendency to keep applying technology (Fred D. Davis, 1989). The level of technology use can be predicted by the user's attitude and attention to the technology (B.U. et al., 2021). Thus, UI/UX and Security as a trigger of PEU and PU will affect the intention

to use. In addition, Trust and Expected return as the financial variable will directly affect intention to use of Robo advisor in Indonesia.

g. Actual Use

Is a real condition of system application (Davis, 1989). It's pleasure to use the system if they believe that the system is not difficult to use and has proven to improve performance, which is reflected in the real conditions of use. The actual form of system/technology usage is how often and duration of system/technology usage. actual technology use is measured by the amount of time accumulated and how often time is spent interacting with technology.

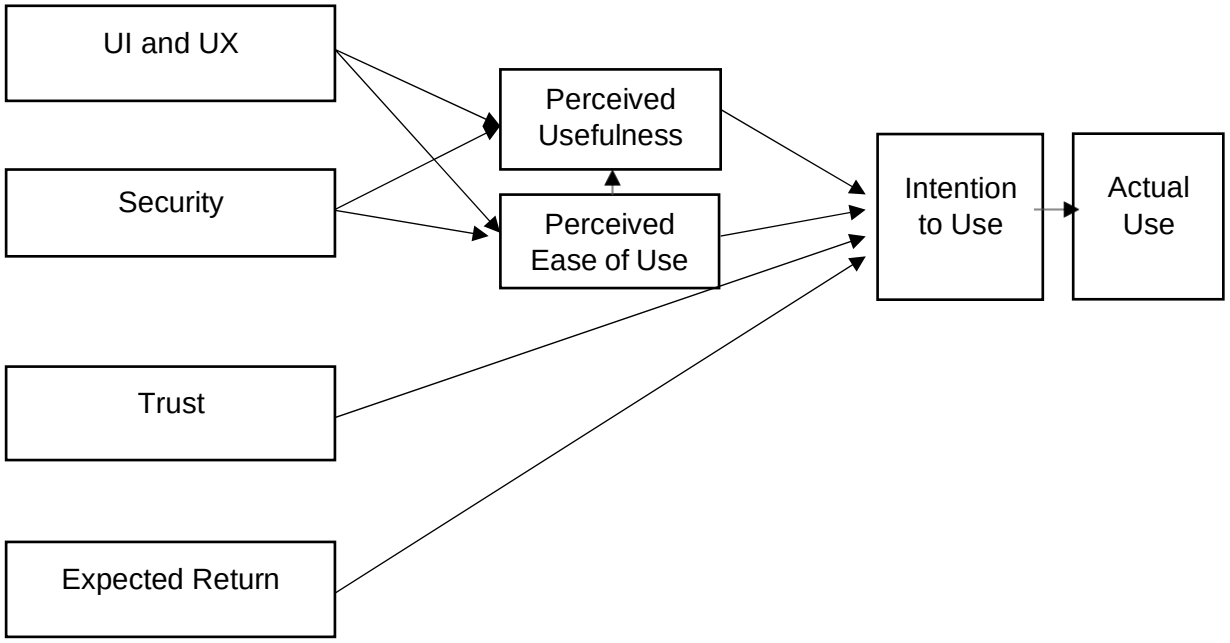

Figure: Proposed Conceptual Model

DISCUSSION & CONCLUSION

The paper understudies of Technology Acceptance Model (TAM) and proposed the additional variable as extended about the actual use of an investment platform called Robo advisor. The model proposed in this paper also includes factors that drive the main variables of TAM theory (PEU and PE) are UI and UX and security. Design and appearance and the ease of use of the application are expected to encourage investors' desires with all the benefits and convenience. The security factor is also very important amid many cases of theft of personal data by several company application-based so that it can add to the part of TAM theory in the context of Robo advisors in Indonesia.

The literature on Trust and expected return as the variable which has a direct effect hypothesis on intention to use provides a useful tool to explore and further develop both trust and expected return literature. The framework allows the researcher to look at the gaps in the literature and can explore the future studies in terms of investment areas, especially Robo advisor. Some research ignores that the Robo advisor context is very close to investment behavior. Additionally, this variable can fill support in finding a new body of knowledge.

LIMITATION

Conceptual papers have limitations and leave many questions unanswered even though the robot advisor context is a new and developing context in Indonesia. It would be very interesting to explain the variables that exist in real application on the intention to use Robo advisor technology by investors by conducting empirical research.

THEORITICAL IMPLICATION

We develop literature on the main variables of TAM theory (Perceived of Usefulness and Perceived Ease of Use) with two more specific driving factors for the use of the Robo Advisor application, namely UI/UX and the Security variable in maintaining customer personal data in the application which is expected to be reliable. This driving factor can further clarify the reasons for using Robo advisor technology in Indonesia. Several previous studies did not include variables related to finance, but articles related to the investment context using Robo advisors. So that various beliefs in fintech Robo advisors and expected returns can be the basis for developing theories on the acceptance of Robo advisors.

MANAGERIAL IMPLICATION

The factors that drive the acceptance and use of Robo advisor technology are still in the perspective of the usefulness and ease of application. Adding variables related to finance (Trust and Expected Return) will clarify what factors encourage investors to use Robo advisor applications for investment.

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