(RESEARCH ARTICLE)

Analysis of investment decisions with financial technology as a moderating variable among private employees in Surabaya

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Abstract

This study discusses the impact of financial literacy, risk perception, and tax literacy on the investment decisions of private employees in Surabaya with fintech technology as a moderator. Private employees, especially those from the millennial generation, appear to have increased their investment activities, with advances in fintech technology playing a significant role in the investment process. This study uses a quantitative approach by administering a questionnaire to 100 private sector employees who are part of the millennial generation. Using smartPLS 4.0 for data analysis, the findings indicate that financial literacy, risk perception, and tax literacy contribute to the investment decisions made by private sector employees. Furthermore, this study shows that fintech technology can moderate the relationship between financial literacy and risk perception on investment decisions. However, fintech technology does not influence tax literacy in its impact on investment decisions. This aligns with the Theory of Planned Behavior, which posits that attitudes, norms, and self-control play a role in decision-making. To provide a more comprehensive understanding, future research should expand the sample size and investigate additional variables such as investment experience and economic conditions. Overall, this study provides valuable insights for improving and implementing effective investment strategies for private sector employees in the digital age.

Keywords: Investment decisions; Financial literacy; Risk perception; Tax literacy; Fintech technology

1. Introduction

Economic growth in Indonesia is experiencing dynamics that require serious attention in order to achieve progress and sustainable growth. To this end, in order to face significant changes and ongoing globalization, a shift or transformation of economic growth sources is needed. One of the phenomena and indicators that has improved is investment. Investment has become one of the primary drivers in creating sustainable economic growth. Various investment instruments, primarily related to the capital market such as bonds, stocks, and mutual funds, have a direct impact on economic stability from the perspectives of the state, companies, and society. Of course, investors can consider and develop appropriate strategies based on risk and financial objectives.

The development of the 5.0 industrial era has brought about a new paradigm. Information technology dominates and plays a role in various fields, including economics, education, and politics. In recent years, the development of fintech technology has changed the way individuals and organizations conduct financial transactions. One popular form of fintech is online investment, which allows individuals to invest easily and quickly through applications or websites. In line with Syafitri's (2020) research, fintech can provide convenience and eliminate barriers when used.

Based on the OJK Press Release dated November 4, 2024, the Millennial and Generation Z demographics constitute a significant majority of the population, accounting for approximately 53.821% of Indonesia's total population. this aligns

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with the Indonesian Fintech Association (AFTECH) Annual Member Survey (AMS) 2024, which indicates that the majority of fintech users are Millennials and Generation Z, accounting for 68.7%. In line with this data, according to the Central Statistics Agency (BPS), the number of Millennials in Surabaya is 679,770 out of a total population of 3,018,022, or approximately 21.78% of the total population in Surabaya (BPS, 2024). This indicates that Millennials play a significant role in investment growth.

This study will focus on millennials who are still employed and have at least a bachelor's degree. KSEI data shows that the millennial generation only accounts for 24.36%, which is much smaller than the under-30 age group, which is dominated by Generation Z. With fintech technology providing various conveniences, making the right investment decisions still requires a strong foundation in terms of financial knowledge and understanding. The capital market in Indonesia is divided into several financial instruments, including stocks, bonds, and mutual funds. Each investment has its own preferences in terms of risk, taxation, and returns. However, the decision to invest among employees with a bachelor's degree has been declining each year, primarily due to irregular investment patterns, lack of understanding, and numerous considerations. The aspiration to invest undoubtedly necessitates financial literacy to equip individuals with the knowledge, skills, and confidence required. The connection between the aspiration or interest in investing and the inclination to utilize technology for investment is not devoid of potential risks. An individual's perception of risk is associated with fraud, data breaches, and the possibility of loss or gain in investing. Tax literacy is frequently neglected by investors, despite the fact that taxes represent a burden that investors must bear when they generate profits. Therefore, efforts are needed to maintain and enhance employees' investment capacity to make wiser investment decisions. Investment decisions in this study are influenced by Financial Literacy, Risk Perception, and Tax Literacy, with fintech technology acting as a moderator that can strengthen or weaken the influence of Financial Literacy, Risk Perception, and Tax Literacy in investment decisions.

When deciding to invest, an individual or investor engages in an action or behavior that serves as a consideration. These include attitudes, norms, and controls. In line with the Theory of Planned Behavior (TPB) developed by Icek Ajzen (1991), which explains and predicts individual behavior, particularly in the context of decision-making, the main components are attitudes, norms, and controls or perceptions. Therefore, financial literacy as an attitude, risk perception as a control mechanism, and tax literacy as a norm due to the element of compliance as a citizen. As a result, financial literacy, risk perception, and tax literacy influence investment decisions. This is supported by research stating that financial literacy and risk perception influence financial decisions (Fuadatul Hasanah et al, 2022; Resyita & Khoiriyah, 2023; Yuniningsih (2020); Nadhifah & Anwar (2021); Pradipta & Yuniningsih (2023); Taufik Hidayat et al. (2023); and Fadhilah & Purwanto (2022)).

2. Materials and methods

2.1. Literature and Hypotheses

The materials and methods should be typed in Cambria with font size 10 and justified alignment. Authors can select the Normal style setting from the Styles of this template. The simplest way is to replace (copy-paste) the content with your own material. The methods and analysis performed in your research work should be written in this section. A simple strategy to follow is to use keywords from your title in the first few sentences.

2.1.1. Theory of Planned Behavior

The Theory of Planned Behavior assumes that behavior is determined by a person's desire to do it or not, where that desire is also influenced by subjective attitudes and norms. This theory is known as TPB and was developed by Icek Ajzen (1991) as an extension of the Theory of Reasoned Action (TRA) previously formulated by Ajzen and Fishbein (1980). The Theory of Planned Behavior explains that attitudes toward behavior are an important factor in predicting behavior, although it is also necessary to consider an individual's subjective norms and perceived behavioral control. With the intention to behave in relation to investment, an individual will strive to improve their financial literacy, risk perception, and tax literacy in order to make appropriate investment decisions.

2.1.2. Investment Decisions

Mayfield et al. (2008) explain that investment decisions are the result of the interaction between personality characteristics and formed behavioral intentions, which ultimately influence individual involvement in investment activities in a real way. According to Scholey (1999), there are three actions that an investor will take, namely Hold, Buy, or Sell shares. Investors who have long-term investment plans tend to choose shares. An investment decision is the investment of capital with the expectation of obtaining profits in the future (Jogiyanto, 2010 in Asita Nur et al., 2017). According to signaling theory, investment expenditures send positive signals about a company's future growth, thereby

increasing stock prices, which serve as indicators of a company's value (Asita Nur et al., 2017). The decision to invest is one of the affective dimensions that can cause an individual to invest or have a certain intensity after observing, comparing, and considering needs with planned and deliberate efforts.

2.1.3. Financial Literacy

Financial literacy, which seeks to ensure that everyone has a high level of knowledge and the ability to use complex financial technology efficiently, is necessary for using financial technology in the digital age (Morgan, 2020). The OJK defines financial literacy as a series of procedures or actions aimed at improving the information, confidence, and ability of consumers and the general public to manage their money wisely (OJK, 2020). A high level of financial literacy can also help investors project their future investments and ensure that appropriate investment plans are in place for future gains. The relationship between financial literacy and investment decisions has a significant positive impact, meaning that the higher the level of financial literacy of an individual, particularly employees, the higher the likelihood of making investment decisions.

H1: Financial literacy has a positive effect on investment decisions

2.1.4. Risk Perception

Risk is defined as an individual's subjective assumption when perceiving loss from the results of an activity (Asri & Susanti, 2018). Risk has two effects, namely positive effects, also known as opportunities, and negative effects, also known as threats. However, risk is generally understood only as a negative effect or threat, such as loss and damage, whereas threats should be understood as uncertainties that may or may not occur but can be anticipated and understood so that they can be managed into strategies to avoid threats or become anticipations or successes (Rizqiah, 2017). The level of risk an individual perceives influences their investment choices, especially if they fear losing money. Investors will think twice before taking risks with capital market instruments if they have a high risk perception. The relationship between risk perception and investment decisions has a significant negative influence, meaning that the higher the level of risk perception an individual has, especially among employees, the lower the decision to invest.

H2: Risk perception has a negative effect on investment decisions

2.1.5. Tax Literacy

Febriyani and Kusmuriyanto (2015) in their research explain that tax knowledge is the ability of a taxpayer to understand tax regulations, both in terms of the tax rates they will pay and the benefits of taxes that will be useful for their lives. According to Susmiatun (2014), tax compliance refers to the condition or state in which taxpayers exercise their rights, particularly their obligations, in a timely manner, disciplined manner, and in accordance with the applicable laws and regulations and tax procedures. Individuals' understanding of the purpose and benefits of taxes is strengthened by a higher level of tax literacy, which ultimately improves taxpayer compliance. With sufficient understanding of taxes, investors can make wiser and more optimal decisions, as well as minimize potential losses caused by unexpected tax obligations. The relationship between tax literacy and investment decisions has a significant positive impact, meaning that the higher the tax literacy level of millennial and Gen Z employees, the higher the decision to invest.

H3: Tax literacy has a positive effect on investment decisions

2.1.6. Fintech Technology

According to (Siskawati & Ningtyas, 2022) Financial technology (fintech) is the result of a combination of financial services and technology that ultimately changes the business model from conventional to moderate, which initially involved face-to-face payments and carrying cash, and now remote payment transactions can be made in just seconds. Generally, technology has two main benefits: it serves as a model to enhance users' insights and understanding, and it acts as a development model for system designers and implementers as a basis for evaluating a system (Apriliana, 2020). Fintech provides various solutions that simplify access to and understanding of financial products and offer tools to help individuals make more informed investment decisions. Fintech technology provides security and convenience. Investors will ensure that the money stored on the fintech platform is safe and will not suddenly disappear. The use of financial technology also affects tax compliance because it is a system that can accelerate financial access and facilitate business actors in carrying out financial operations, including paying taxes. The relationship between the use of fintech technology and investment decisions through financial literacy, risk perception, and tax literacy has a significant positive influence, meaning that the higher the level of investment decisions made by employees through financial literacy, risk perception, and tax literacy, the higher the use of fintech technology.

- H4: Fintech technology moderates the influence of financial literacy on investment decisions
- H5: Fintech technology moderates the influence of risk perception on investment decisions
- H6: Fintech technology moderates the influence of tax literacy on investment decisions

2.2. Methodology

The data in this study are primary data obtained directly from the original source (not through intermediaries). The Likert scale is used to measure the attitudes, opinions, and perceptions of an individual or group of individuals regarding social phenomena (Sugiyono, 2019). The scope of investment instruments used in this research is the Capital Market, including shares, mutual funds, and bonds. The focus of this study is private sector employees located in Surabaya. The criteria established for this study are as follows:

- Minimum age of 29 years old or born in 1996
- Currently employed and earning a minimum income of the Surabaya Minimum Wage or at least Rp 5,500,000 (five million five hundred thousand rupiah)
- Have experience in investing in the stock market
- Employed as a private-sector employee in Surabaya

According to Ghozali (2007), the minimum sample size for this study is 100. The independent variables include financial literacy, risk perception, and tax literacy. The dependent variable is investment decision, with fintech technology as a moderating variable. The questionnaire was distributed via Google Forms and contained 20 questions. Data analysis was conducted using SmartPLS 4.0.

Table 1 Variable Indicators

Variables	Indicators	Sources
Investment Decision (Y)	1. Investment Commitment 2. Allocation Preferences 3. Portfolio Management 4. Independence and Self-Confidence 5. Knowledge Development and Investment Diversification	C Mayfield et al (2008) and Tandelilin (2001)
Financial Technology (Z)	1. Perceived usefulness 2. Ease of Use 3. Ease of Accessing Information	Siskawati and Ningtyas (2022) and Pavlou (2003)
Financial Literacy (X1)	1. Financial Knowledge 2. Savings and Loans 3. Insurance 4. Investment	Chen and Volpe (1998) and Yuniningsih & Santoso, (2020)
Risk Perception (X2)	1. Financial Risk 2. Security Risk 3. Time Risk 4. Privacy Risk	G. B. Boyetey (2021) and Asti and Susanti (2018)
Tax Literacy (X3)	1. Tax Awareness 2. Contextual Knowledge 3. Systematic and Measurable Decision-Making Knowledge 4. Tax Compliance Knowledge	Bornman & Wassermann (2018) and Susmiatun (2014)

Source: Output smart-PLS (2024)

3. Results

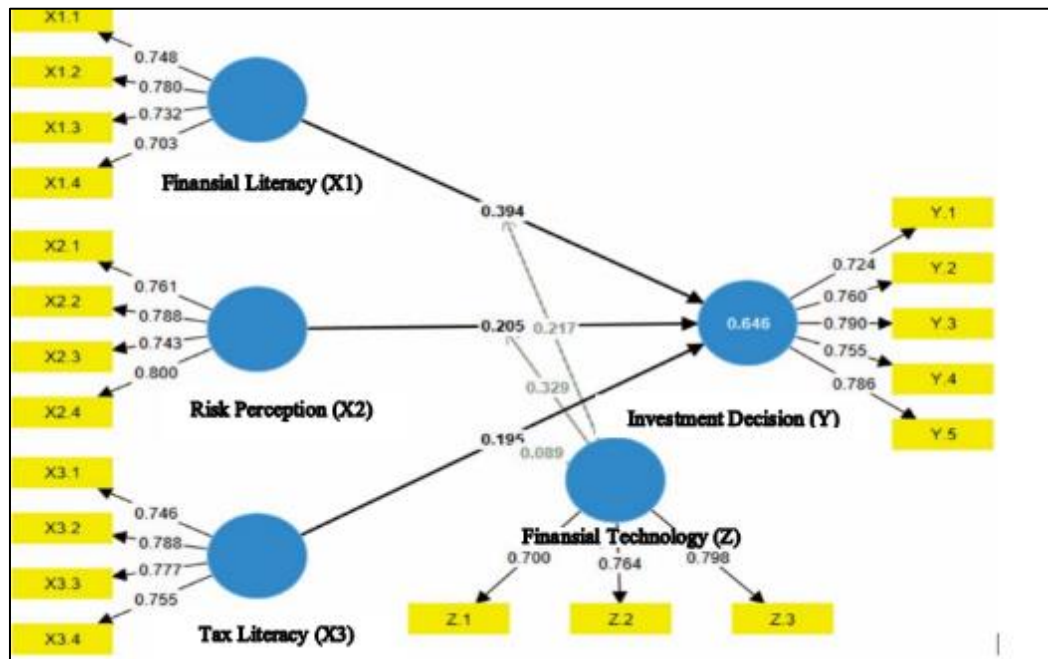### 3.1. SmartPLS Results Analysis

Figure 1 Outer Model

The estimated loading factor results for each construct indicator show that all indicators have met the validity criteria and are suitable for use, with loading factor values above 0.7. Because they have an additional factor value of 0.70 or more, each indicator meets the validity criteria. Therefore, validity through external load has been tested, and the measurement model is considered suitable to proceed to the next testing stage. Overall, the research variables Financial Literacy, Risk Perception, Tax Literacy, Fintech Technology, and Investment Decisions have AVE square root values greater than their correlation values with other variables, thus fulfilling discriminant validity.

Table 2 R Square

	R-Square	Adjusted R-Square
Investment Decision (Y)	0.646	0.619

Source: smart-PLS output (2024)

The model has the ability to explain the phenomenon of Investment Decisions by 64.60%, as indicated by the R^2 value (Job Satisfaction) of 0.646. This means that investment decisions are influenced by Financial Literacy, Risk Perception, Tax Literacy, and Fintech Technology by 64.60%, while 35.40% is influenced by other variables such as lifestyle, locus of control, social media, and so on. Thus, it can be concluded that the model in this study has relevant predictive value. The results of the combined reliability tests and Cronbach's alpha indicate that all constructs have acceptable reliability with values exceeding 0.7.

3.2. Hypothesis Results

Table 3 Hypothesis Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic (|O/STDEV|)	P Values
Financial Literacy (X1) → Investment Decision (Y)	0.394	0.384	0.096	4.109	0.000
Risk Perception (X2) → Investment Decision (Y)	0.205	0.212	0.102	2.012	0.045
Tax Literacy (X3) → Investment Decision (Y)	0.195	0.185	0.085	2.306	0.022
Fintech Technology (Z) → Investment Decision (Y)	0.266	0.269	0.123	2.166	0.031
Fintech Technology (Z)* Financial Literacy (X1) → Investment Decision (Y)	0.217	0.194	0.105	2.070	0.039
Fintech Technology (Z)* Risk Perception (X2) → Investment Decision (Y)	0.329	0.307	0.100	3.281	0.001
Fintech Technology (Z)* Tax Literacy (X3) → Investment Decision (Y)	0.089	0.095	0.076	1.171	0.242

Source: SmartPLS output, 2025

H1: Financial literacy has a significant positive effect on investment decisions with a path coefficient of 0.394, where the p-value = 0.000 is less than $\alpha = 0.05$.

H2: Risk Perception has a significant positive effect on Investment Decisions with a path coefficient of 0.205, where the p-value = 0.045 is less than the α value = 0.05.

H3: Tax literacy has a significant positive effect on investment decisions with a path coefficient of 0.195, where the p-value = 0.022 is less than the α value = 0.05.

H4: Moderator-1 (Z*X1) has a significant positive effect on investment decisions with a path coefficient of 0.217, with a p-value of 0.039, which is less than the α value of 0.05.

H5: Moderator-2 (Z*X2) has a significant positive effect on investment decisions with a path coefficient of 0.329 and a p-value of 0.001, which is greater than the α value of 0.05.

H6: Moderator-3 (Z*X3) does not influence investment decisions with a path coefficient of 0.089, where the p-value = 0.242 is greater than the α value of 0.05.

4. Discussion

Based on the results of the study, it was found that financial literacy can improve investment decisions. Thus, it can be concluded that Millennial investors, especially private employees in Surabaya, agree that individual confidence in financial literacy is an important element in encouraging more mature and responsible investment decisions. The findings of this study align with the Theory of Planned Behavior, where financial literacy plays a significant role in enhancing an individual's ability to make decisions related to finance, including investment decisions. Good financial knowledge provides a foundation for individuals to evaluate various investment alternatives, assess risks and returns, and align decisions with short-term and long-term financial goals, as stated in the research by Fuadatul Hasanah et al.

(2022), which indicates that financial literacy has a positive and significant influence on investment interest and behavior.

Based on the results of the research conducted, it was found that risk perception can increase investment decisions. In other words, understanding risk does not always lead to avoiding investment, but can encourage someone to prepare better risk strategies and management. Millennial investors, especially private employees in Surabaya, view risk as an opportunity rather than something to be avoided. In TPB, Perceived Behavioral Control reflects an individual's perception of their ability to perform or control an action. Positive risk perception indicates that even though individuals are aware of the potential risks in investing, they still feel capable of managing those risks. This study confirms previous findings by Asri and Susanti (2018) that risk perception significantly influences decision-making behavior, although in a different context, namely shopping decisions on e-commerce platforms.

Based on the results of the research conducted, it was found that tax literacy can improve investment decisions. This means that an increase in tax literacy will be followed by an increase in investment decision-making. Adequate tax literacy can increase individuals' confidence and readiness in making investment decisions. Millennial investors, especially private employees in Surabaya, view tax literacy as an understanding and obligation that must be fulfilled in investment activities, not something to be avoided or ignored. In TPB, Perceived Behavioral Control reflects that tax understanding not only influences cognitive aspects (knowledge) but also builds norms that fiscally responsible individuals are expected to consider the tax implications of every investment decision. In line with Rizky Dwi Ananda's (2019) research, it also shows that tax knowledge has a positive impact on taxpayer compliance while reducing non-compliance rates.

This study reveals that Fintech Technology can strengthen the relationship between Financial Literacy and investment decision-making. The role of fintech as a moderating variable in this study provides original and relevant theoretical contributions to the current development of financial sector digitalization. This is also consistent with the characteristics of Millennial investors, particularly private sector employees in the stock market in Surabaya, who demonstrate a strong desire for financial independence. When equipped with good financial literacy and the ability to utilize fintech technology, they tend to be more confident in making investment decisions based on self-control and personal rationality. The Theory of Planned Behavior (TPB) supports that perceived behavioral control, or an individual's perception of their ability to perform a certain action, in this case investment, will be stronger when supported by financial literacy and technological support that facilitates the process. The findings of this study align with research conducted by Hikmah (2021), which demonstrated that fintech adoption can enhance financial skills and behavior among the public, as well as facilitate financial literacy understanding through more accessible digital platforms.

Based on the results of the study, it was found that fintech technology is capable of strengthening the relationship between risk perception and investment decisions. Fintech can serve as a tool that accelerates and simplifies the investment process, while risk perception remains a complex psychological factor that can be mitigated by the presence of fintech technology. Investors who are still uncertain about potential losses, data security risks, or digital market fluctuations will consider these factors when making investment decisions, thus requiring the convenience offered by fintech. In the Theory of Planned Behavior, investors who do not yet have full confidence in fintech will continue to perceive significant risk, thereby hindering or delaying investment decisions. Research by Sultan Ortega et al. (2023) found that the adoption of fintech in digital investment strengthens risk perception, particularly in terms of cybersecurity, regulatory uncertainty, and potential financial losses.

The results of the study indicate that fintech technology does not sufficiently strengthen the relationship between tax literacy and investment decisions. This means that the level of fintech does not strengthen or weaken the influence of tax literacy on investment decisions statistically. Although fintech offers convenience in transactions and access to various investment products, tax knowledge remains a separate factor that requires in-depth understanding from investors. As the respondents in this study were private sector employees whose tax reports were only for work performed and already deducted by the company, they felt that fintech technology had no influence on their investment decisions because the application of taxes in investing was already entrusted to fintech technology. Tax literacy is conceptual and regulatory in nature, not merely related to access to technology or ease of transactions. Tax literacy is more closely related to attitude and subjective norms that influence investment intentions, while fintech plays a greater role in perceived behavioral control. In line with the research by Ignasia and Utomo (2023), digital literacy is more influenced by financial literacy than tax literacy in investment decisions.

5. Conclusion

Based on the results of research and data analysis, there are findings regarding the significant influence of financial literacy, risk perception, and tax literacy in increasing investment among private employees in Surabaya who fall into the millennial generation category. In addition, the data analysis found that fintech technology can provide a boost in the relationship between financial literacy and risk perception on investment decisions. Conversely, tax literacy reinforced by fintech technology cannot increase investment decisions among Generation Z in Surabaya. Although fintech technology can provide a better understanding, the existence of tax literacy is still insufficient to encourage private employees to make more mature investment decisions. With these research results, it is hoped that in the future, it will be recommended to explore investment sectors that are the main preferences of the millennial generation. This exploration is important to understand the investment orientation of Millennials in the digital and sustainability era. Additionally, it is necessary to consider adding variables not analyzed in this study to provide a more comprehensive picture for investors.

Compliance with ethical standards

Disclosure of Conflict of interest

The authors declare no conflict of interest in the article because there was no funding from any party with
 s that would interfere with the results of this research.

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