

The Factors Influencing Sustainable Investment in Digital Investment Applications in Indonesia

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Abstract - This study aims to analyze the factors influencing sustainable investment in digital investment applications in Indonesia. The independent variables consist of risk preference and investment horizon, while income, gender, and age are included as moderating variables. The research population comprises 479 students of the Master of Management program, employee class, at Universitas Mercu Buana, with a final sample of 85 respondents who fully completed the questionnaire. A quantitative research method was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal that risk preference and investment horizon positively affect sustainable investment. However, demographic variables such as income, gender, and age do not moderate the effect of risk preference or investment horizon on sustainable investment. These findings indicate that behavioral factors are more influential than socio-demographic characteristics in shaping sustainable investment decisions. The study contributes to the body of literature on sustainable finance in Indonesia and provides practical implications for regulators and digital investment platforms to foster broader participation in sustainable investment products.

Keywords: Sustainable investment, risk preference, investment horizon, income, gender, age

I. INTRODUCTION

The growing emphasis on environmental, social, and governance (ESG) criteria has reshaped global investment practices. Recent surveys highlight this trend, with BNP Paribas Global (2023) reporting a 20% increase in social considerations since the COVID-19 pandemic, and 79% of respondents believing that social aspects positively influence long-term investment performance and risk management. This shift reflects that investment decisions are no longer solely profit-oriented but increasingly incorporate sustainability concerns (Hawley & Williams, 2017).

In Indonesia, the rapid digitalization of the financial sector has accelerated the adoption of investment applications, particularly among millennials and Gen Z. According to KSEI (2024), these younger generations dominate the domestic capital market and show greater openness to digital finance. Digital investment platforms not only enhance accessibility but also provide an opportunity to promote sustainable investment awareness (OJK, 2024).

At the macro level, Indonesia's investment landscape has remained robust. The Investment Coordinating Board (BKPM, 2024) reported a total realization of IDR 1,714.2 trillion, marking a 20.8% increase from the previous year. Meanwhile, sustainable investment has experienced notable growth, with ESG-based mutual funds expanding from IDR 36 billion in 2015 to IDR 3 trillion in 2020. Green bonds and sukuk issuance reached IDR 5.4 trillion by 2022, while sustainable banking financing exceeded IDR 809.75 trillion. Although its contribution to the total national investment remains relatively modest, sustainable investment demonstrates a higher growth trajectory compared to conventional instruments.

Prior studies emphasize the role of behavioral and sociodemographic factors in sustainable investment decisions. Risk-return preferences and investment horizon significantly influence investor choices (Harahap & Sutrisno, 2021; Widya & Hapsari, 2023), while income, gender, and age shape distinct investment behaviors (Taufik & Shukor, 2022; Rahayu & Setiawan, 2022). However, despite the increasing popularity of ESG and the rise of fintech, empirical evidence linking these factors to sustainable investment through digital investment platforms in Indonesia remains scarce.

This study seeks to fill this gap by examining the effects of risk preference and investment horizon on sustainable investment decisions, with income, gender, and age as moderating variables. The contribution of this study is twofold: (1) theoretical, by extending the literature on sustainable finance, behavioral finance, and sociodemographic determinants within the context of fintech adoption; and (2) practical, by offering insights for

regulators and digital investment platforms to design products and policies that align with investor characteristics and sustainability objectives.

Behavioral Finance

Behavioral Finance explores how psychological and emotional factors influence financial decision-making, deviating from the rational assumptions of traditional finance. Kahneman and Tversky (1979), through their Prospect Theory, argue that individuals tend to be more sensitive to losses than to equivalent gains, a phenomenon known as *loss aversion*. Thaler (1999) later introduced the concept of *mental accounting*, in which individuals separate money into different “mental accounts” such as savings, consumption, and investment, leading to non-optimal allocation decisions. Other well-documented biases include *overconfidence*, where investors overestimate their knowledge and take excessive risks (Barberis & Thaler, 2003), and *anchoring*, where investors rely heavily on initial information even if it is irrelevant (Tversky & Kahneman, 1974). Behavioral finance also emphasizes *herding behavior*, in which individuals follow the majority, often fueling speculative bubbles (Shiller, 2000). These insights provide a realistic lens for understanding why investment decisions are not always rational and why sustainable investing may appeal to some investors.

Socially Responsible Investing (SRI)

The concept of socially responsible investing (SRI) was introduced by Moskowitz (1972), highlighting the integration of ethical and social considerations into investment decisions. SRI operates through two primary mechanisms. The first is *negative screening*, in which investors avoid companies involved in controversial sectors such as tobacco, alcohol, gambling, or weapons. The second is *positive screening*, which actively seeks firms demonstrating responsible practices, such as reducing carbon emissions, supporting workers' welfare, or ensuring good governance. These strategies show that investments are not solely evaluated based on financial returns but also on their broader impact on society and the environment.

Financial Technology and Robo-Advisors

Financial technology (FinTech) has transformed the investment landscape by providing wider and more affordable access to financial products, including sustainable investment options. Robo-advisors, in particular, play an important role in tailoring portfolios to investors' risk tolerance and financial objectives through algorithms (Gomber et al., 2018). Jung et al. (2018) note that younger generations, such as Generation Z, are more likely to adopt digital financial platforms. This technological shift implies that sustainability-oriented investment may become more accessible to younger investors who are already digitally literate.

Behavioral Theory

Behavioral theory, rooted in psychology, also provides useful insights into investment behavior. Watson (1913) introduced behaviorism, emphasizing that behavior is a response to external stimuli. Skinner (1938) later developed the idea of *operant conditioning*, in which reinforcement or punishment shapes future behavior. Bandura (1963) proposed *social learning theory*, suggesting that individuals learn not only from direct experience but also by observing and imitating others. In investment decisions, this means that choices can be influenced by social interactions, peer behavior, and collective norms, all of which may encourage or discourage sustainable investment practices.

Risk-Return Preference

Risk-return preference reflects how investors balance potential returns with exposure to risk. Dorfleitner et al. (2015) and Renneboog et al. (2008) categorize investors into *financial-first* and *impact-first* groups. The former prioritize financial returns but still consider social outcomes, whereas the latter focus primarily on social and environmental impacts, even at the expense of financial gains. Risk tolerance plays a critical role here: risk-averse investors may view sustainable investments as safer and more stable, while risk-tolerant investors may pursue higher returns with less concern for sustainability.

Investment Horizon

Investment horizon refers to the length of time an investor intends to hold an asset. Brigham and Ehrhardt (2017) classify horizons into short-term (less than three years), medium-term (three to ten years), and long-term (more than ten years). Short-term investors typically favor safer instruments such as deposits and short-term bonds, whereas long-term investors are more willing to withstand volatility for potentially greater rewards. Because sustainability impacts are often realized in the long run, longer investment horizons are more compatible with sustainable investment strategies.

Sociodemographic Characteristics

Sociodemographic variables such as age, gender, education, occupation, income, and family background influence investment attitudes and behaviors (Kotler et al., 2016). For instance, younger investors may be more willing to adopt innovative financial technologies and sustainable practices, while older investors may prioritize security. Similarly, gender differences affect risk preferences, with women often more cautious and socially conscious in their financial decisions.

Previous Studies

A number of prior studies, both international and national, provide empirical support for the determinants of sustainable investment. International studies suggest that risk tolerance, financial literacy, demographic factors, and technological platforms significantly influence sustainable investment decisions. For example, Faradynawati and Söderberg (2022) found that investors with low risk tolerance, short investment horizons, women, older individuals, and those with lower income are more likely to invest in sustainable products. Singh and Kumar (2024) demonstrated that trust, perceived usefulness, and risk perceptions significantly shape attitudes toward robo-advisory services, with gender playing a moderating role. Similarly, Yucel et al. (2023) confirmed that sustainable finance literacy and income positively affect sustainable investment attitudes. Capponi and Zhang (2020) showed that wealthier and financially literate investors hold more efficient portfolios, while Tahira Iram et al. (2023) highlighted the mediating role of financial literacy in shaping women entrepreneurs' investment decisions under behavioral biases.

At the national level, Indonesian studies provide further insights. Tobing et al. (2022) examined the legal framework of green bonds and found that weak regulations increase the risk of *greenwashing*. Loso-Judijanto et al. (2024) revealed that Generation Z investors show a strong tendency toward sustainable investment, influenced by social factors and financial literacy. Besri et al. (2023) emphasized the role of financial literacy and religiosity in shaping investment intentions. Ahmadin et al. (2023) confirmed the positive influence of ESG factors on investment decisions, while other studies such as Sari (2021) and Gita Lara et al. (2022) showed that expected returns and self-efficacy significantly predict millennials' and Gen Z's investment intentions, though risk preference was not always a significant determinant. Collectively, these findings underline the importance of psychological, social, demographic, and technological variables in understanding sustainable investment behavior.

Drawing upon the theories and empirical evidence, this study proposes the following hypotheses:

H1: Risk preference positively influences sustainable investment.

H2: Investment horizon positively influences sustainable investment.

H3: Income does not moderate the effect of risk preference on sustainable investment.

H4: Income does not moderate the effect of investment horizon on sustainable.

H5: Gender does not moderate the effect of risk preference on sustainable investment.

H6: Gender does not moderate the effect of investment horizon on sustainable investment.

H7: Age does not moderate the effect of risk preference on sustainable investment.

H8: Age does not moderate the effect of investment horizon on sustainable investment.

II. METHOD

This study employed a quantitative research method using a causal approach to examine the effect of risk preference and investment horizon on sustainable investment, with income, gender, and age as moderating variables. The data were collected through an online survey distributed to individual investors in Indonesia who had prior investment experience in capital markets or financial technology platforms. The sampling technique applied was purposive sampling, and the minimum sample size was determined based on the *rule of thumb* for PLS-SEM analysis as suggested by Hair et al. (2014). The number of valid responses obtained exceeded the required threshold, ensuring adequate statistical power.

The primary data were obtained from structured questionnaires, while secondary data were collected from relevant academic literature, regulatory reports, and market statistics published by the Financial Services Authority (OJK) and the Indonesia Stock Exchange (IDX). The questionnaire was designed with closed-ended questions measured on a five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5). Risk-return preference was measured through indicators reflecting individual tolerance toward risk and expected return. Investment horizon was assessed through items describing the length of time respondents intended to hold their investments. Sustainable investment intention was measured using items adapted from studies on socially responsible investing and ESG perspectives. Moderating variables such as gender, income, and age were captured through demographic questions.

Data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique with SmartPLS 4.0 software. The analysis included both the measurement model and the structural model. The

measurement model was evaluated through validity and reliability tests, while the structural model was used to test the research hypotheses and assess the significance of the proposed relationships.

III. RESULT AND DISCUSSION

A. Result

A total of 85 respondents participated in this study, with the majority being male (70.59%) compared to female (29.41%). In terms of age distribution, most respondents belong to the Millennial generation (1981–1996) with 47.06%, followed by Generation X (1965–1980) at 27.06%, and Generation Z (1997–2012) at 25.88%. Regarding income, the majority of respondents earn less than IDR 20 million (71.76%), while 16.48% are in the IDR 21–40 million range, and 11.76% earn more than IDR 40 million. In addition, respondents also reported the investment platforms they use, with the highest proportion selecting other platforms (28.24%), followed by Bibit (15.29%), no investment platform (15.29%), and Mirae/MStock (10.59%). Smaller proportions use gold (9.41%), real estate (8.24%), Ajaib (4.71%), Indodax (4.71%), and banks (3.53%).

Table 1. Sample Description

Criteria	Category	Total	%
Gender	Male	60	70.59%
	Female	25	29.41%
Age	Millennial (1981–1996)	40	47.06%
	Gen X (1965–1980)	23	27.06%
	Gen Z (1997–2012)	22	25.88%
Income	< IDR 20 million	61	71.76%
	IDR 21–40 million	14	16.48%
	> IDR 40 million	10	11.76%
Investment Platform	Others	24	28.24%
	Bibit	13	15.29%
	None	13	15.29%
	Mirae / MStock	9	10.59%
	Gold	8	9.41%
	Property (Real Estate)	7	8.24%
	Ajaib	4	4.71%
	Indodax	4	4.71%
	Bank	3	3.53%

Stages of measuring in testing the model involve convergent validity test and discriminant validity. Meanwhile, the values of Cronbach's alpha and composite reliability are needed in testing construct reliability. PLS analysis result can be used to test research hypotheses if all indicators in the PLS model have met the requirements of convergent validity, discriminant validity, and reliability test.

Convergent validity test is carried out by examining the value of loading factor of each indicator towards its construct. According to most references, loading factor values of at least 0.7 are considered to have strong enough validity to explain latent constructs (Chin, 1998; Ghozali, 2014; Hair et al., 2010). In this research, the minimum acceptable limit of loading factor is 0.7, provided that the AVE score of each construct is greater than 0.5 (Ghozali, 2014). After data processing with SmartPLS 3.0, some indicators such as RP.2 and SUS.4 showed loading factors below 0.7, but since the AVE values of all constructs exceed 0.5, the overall convergent validity is still considered acceptable. The valid measurement model can be seen in Figure 2. Therefore, the convergent validity of this research model has met the requirements. Loading factors, Cronbach's alpha, composite reliability, and AVE for each construct are presented in Table 2.

Discriminant validity is conducted to ensure that each latent variable is different from the others. A model is said to have good discriminant validity if the square root of AVE for each construct (value on the diagonal) is greater than the correlation value between constructs (values below diagonal) (Ghozali, 2014). The result of discriminant validity test is assessed using the Fornell-Larcker Criterion, which is presented in Table 3. The result shows that the square root of AVE for each construct is higher than the correlation values with other latent variables, meaning the discriminant validity requirement is fulfilled (Fornell & Larcker, 1981).

Construct reliability is assessed from the values of Cronbach's alpha and composite reliability of each construct. The suggested threshold for both values is greater than 0.7 (Ghozali, 2014). The reliability test results shown in Table 2 indicate that all constructs have Cronbach's alpha and composite reliability values above 0.7. In conclusion, all constructs in this research meet the required reliability.

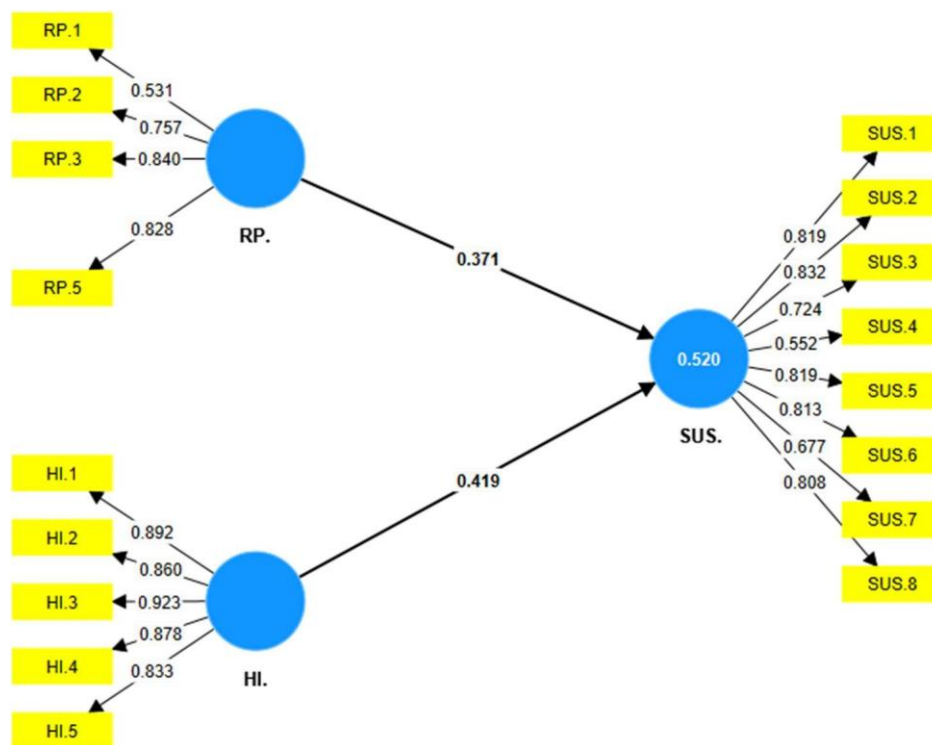


Figure 1. Valid Research Model

Source: processing result of SmartPLS 4.0 (2025)

Table 2. Items Loadings, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE)

Variable	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Investment Horizon (HI)	0.925	0.934	0.944	0.77
Risk Preference (RP)	0.73	0.763	0.833	0.562
Sustainable Investment (SUS)	0.894	0.911	0.916	0.58

Source: processing result of SmartPLS 4.0 (2025)

Table 3. Discriminant Validity

Variable	HI.	RP.	SUS.
HI.	0.878		

RP.	0.665	0.75	
SUS.	0.666	0.65	0.761

Source: processing result of SmartPLS 4.0 (2025)

Table 4. R Square Value

Variable	R-square	R-square Adjusted
SUS.	0.52	0.508

Source: processing result of SmartPLS 4.0 (2025)

Table 6. Hypotheses Testing

Relationship	Original sample (O)	Standard deviation (STDEV)	T statistics (O/STDEV)	T table	P values	Hasil
RP → SUS	0.371	0.106	3.484	1.664	0.000	Positive and Significant
HI → SUS	0.419	0.111	3.793	1.664	0.000	Positive and Significant

Source: processing result of SmartPLS 4.0 (2025)

Hypothesis testing in PLS is also referred to as inner model testing. This test includes the significance test of direct and indirect effects, as well as the measurement of the effect size of exogenous variables on endogenous variables. Direct effect testing is performed using the T-statistic test in the Partial Least Squares (PLS) analysis with the help of SmartPLS 3.0 software. Through the bootstrapping technique, the values of R square and significance can be obtained as shown in Table 5 and Table 6. Based on Table 5, the R square value of Sustainable Investment (SUS) is 0.52, which means that the variation in Sustainable Investment can be explained by Risk Preference (RP) and Investment Horizon (HI) by 52%, while the remaining 48% is explained by other variables not discussed in this research. According to Chin (1998), this R square value falls into the moderate category.

Meanwhile, Table 6 shows the T-statistics and P-values that explain the relationships between the variables. The test result indicates that the path coefficient of Risk Preference (RP) towards Sustainable Investment (SUS) is 0.371 with T-statistic value of 3.484 (> 1.664) and P-value of 0.000 (< 0.05). This means that Risk Preference has a positive and significant effect on Sustainable Investment. Similarly, the path coefficient of Investment Horizon (HI) towards Sustainable Investment (SUS) is 0.419 with T-statistic value of 3.793 (> 1.664) and P-value of 0.000 (< 0.05). This result indicates that Investment Horizon also has a positive and significant effect on Sustainable Investment. In conclusion, both Risk Preference and Investment Horizon significantly contribute to the variation in Sustainable Investment, with the model showing a moderate explanatory power ($R^2 = 0.52$).

B. Discussion

The results of this study confirm that both risk preference and investment horizon play significant roles in influencing sustainable investment decisions among investors in Indonesia. The positive effect of risk preference on sustainable investment indicates that individuals with a higher tolerance for risk are more likely to allocate their funds toward sustainable instruments. This finding is consistent with traditional finance theory, which posits that risk-return considerations are central to investment decisions, as well as prior studies that suggest risk-tolerant investors are more open to alternative and innovative investment products, including those with a sustainability orientation. Similarly, the finding that a longer investment horizon positively influences sustainable investment suggests that individuals with long-term perspectives are more willing to invest in sustainable instruments, which often require a longer time frame to generate substantial returns. This result supports the growing consensus in the literature that long-termism is closely aligned with sustainability principles, as sustainable investments tend to produce financial and social value over extended periods.

Interestingly, this study also reveals that demographic factors such as income, gender, and age do not significantly moderate the relationships between risk preference, investment horizon, and sustainable investment. This suggests that the influence of behavioral and temporal factors on sustainable investment is relatively consistent across socio-demographic groups. While some prior studies have highlighted potential differences, such as millennials' greater tendency toward sustainable investment, the current findings demonstrate that such

variations are not statistically significant. This indicates that sustainable investment behavior may be more strongly driven by intrinsic values, risk-return considerations, and long-term orientation rather than demographic characteristics.

From a theoretical perspective, these findings contribute to the sustainable finance literature by reaffirming the importance of behavioral determinants such as risk preference and time orientation. They also align with the principles of behavioral finance, which emphasize the role of psychological and cognitive factors in shaping investment choices. The absence of significant moderating effects of socio-demographic variables suggests that sustainable investment intention is shaped more by universal behavioral drivers rather than context-specific demographic traits.

IV. CONCLUSION

Based on the results and discussion of this study on the factors influencing sustainable investment in Indonesia, several conclusions can be drawn. Risk preference has a positive effect on sustainable investment, indicating that the higher the investor's risk tolerance, the greater their interest in sustainable investment instruments. Investment horizon also positively influences sustainable investment, meaning that the longer the investment orientation, the higher the tendency of investors to allocate funds into sustainable instruments. Meanwhile, income, gender, and age do not significantly moderate the relationships between risk preference, investment horizon, and sustainable investment, suggesting that these demographic characteristics do not fundamentally alter the influence of behavioral factors, although millennials tend to show a more consistent positive effect. These findings have important policy and practical implications. Policymakers and stakeholders should strengthen financial literacy and education programs, particularly regarding sustainable investment, while promoting awareness of risk profiles and investment horizons to encourage informed decision-making. Additionally, the development of diverse and flexible sustainable investment products, coupled with fiscal and non-fiscal incentives, as well as strengthened ESG disclosure regulations, are crucial to foster growth in this sector. Theoretically, this study contributes to the sustainable finance literature by confirming the role of risk preference and investment horizon as key determinants of sustainable investment intention, while providing practical insights for fintech platforms and investment managers to design products aligned with investor characteristics. Nevertheless, this research has limitations, particularly in its respondent profile, which was dominated by educated and tech-savvy groups, and in the scope of variables, which excluded psychological factors such as investment confidence or risk perception. Future research is recommended to expand the sample to broader socio-economic backgrounds, incorporate psychological and socio-cultural variables, and adopt longitudinal approaches to better capture the evolving dynamics of sustainable investment behavior over time.

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