Exploring the relationship between sustainability attitudes of individual investors and investment preferences in sustainable financial assets

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ABSTRACT,
This research aims to investigate the impact of sustainability attitudes on individual investors' preference for financial sustainability assets. Sustainability is becoming a more and more crucial topic in today's world, having a significant impact on business processes and society. The research explores how individual beliefs and values regarding environmental, social, and governance (ESG) factors shape their investment decisions. A quantitative approach was employed, utilizing a convenience sampling method via LinkedIn to collect data from 56 respondents. Findings indicate a significant correlation between willingness to pay for environmental benefits and interest in socially responsible investments, aligning with prior literature. However, the analysis reveals a limited impact of sustainability attitudes on investment behaviours, highlighting the complex relationship between attitudes toward environmental issues and economic trade-offs. The study provides implications for companies, financial institutions, and policymakers to enhance awareness and education regarding sustainable investing practices.

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Sustainability attitudes, investment preferences, sustainable financial assets, environmental, social, and governance (ESG) factors, financial literacy, social responsibility

1. INTRODUCTION

1.1 Background

The topic of sustainability has become crucial in today's world, having a significant impact on business processes and society. Companies that prioritize sustainability consider the impact of their actions on future generations, as well as contribute to the well-being of present communities by taking into account economic, social and environmental factors (Farrell & Hart, 1998). Companies can ensure long-term success by effectively mitigating risks and adjusting to the changing environment (Bansal & DesJardine, 2014). Sustainable practices help companies not only ensure compliance with their short-term financial goals but also implement the efficient management of scarce resources, as well as fair distribution of wealth. By managing resources effectively and considering the long-term implications of their actions simultaneously, companies positively contribute to environmental preservation and societal well-being, which are the main aspects of sustainable operations. It is crucial for communities and businesses to be aware of environmental concerns and sustainable practices' impact to contribute to global efforts to preserve ecosystems, mitigate climate change, and promote peace and stability (Farrell & Hart, 1998).

The topic of exploring the relationship between the sustainability attitudes of individual investors and their investment preferences in sustainable financial assets is highly relevant for shaping the future of sustainable finance, understanding investor behaviour, and mitigating the risk of greenwashing in the market (Heeb et al., 2022). According to the recent research by Heeb et al. (2022), a substantial pool of investors prioritize investments in sustainable assets or companies with a vision of positive social or environmental impact, emphasizing a growing interest in sustainable investing. Understanding the way individual investors' attitudes towards sustainability influence their investment decisions can provide valuable insights for companies, financial markets, individual investors, and investment firms aiming to build effective investment strategies, as well as for policymakers developing sustainability standards.

According to Bashir (2013), the individual investor decision-making process is a topic that has been extensively studied and analyzed in recent decades. However, there is always room for further research due to emerging trends, innovations, and constantly developing technologies. Nowadays, researchers have made significant progress in understanding the factors that influence investors' behaviour, including factors related to psychology, cognitive biases, and emotional impact. There are several reasons why this area continues to evolve. The main reason is that financial markets are dynamic and constantly evolving in response to economic, geopolitical, and technological developments, which might result in a shift in investor preferences (Slovic, 1972). The implication of the theory suggests that a recent rise in the importance of sustainability being part of a business strategy might have an impact on the investor decision-making rationale change. According to the Slovic (1972), there are several key factors influencing investors decision-making:

First, it is available information: Nowadays, investors have access to a wide array of data from various sources such as financial reports, news channels, analyst reports, and social media.

Psychological factors also have an impact on investors' decision-making: Investment decisions are not always rational but are also influenced by psychological factors. Investors may rely on intuition, feelings, or attitudes while making decisions.

Accuracy of predictions is another factor to consider: Even experienced analysts may have limited predictive abilities when looking at past data, implying the high uncertainty and complexity of financial market tendencies. This means that understanding the limitations of prediction is essential for evaluating investment risk effectively.

1.2 Research Objective

Understanding the main factors that influence individual investors' decision-making, this research focuses on the impact of psychological factors, specifically investors' attitudes towards sustainability. The research is based on the relationship between investors' beliefs, values, and concerns regarding environmental, social, and governance (ESG) issues and their investing preferences. Investment preferences refer to the choices investors make regarding the allocation of their financial resources, taking into account certain factors in their decision-making. The goal of the research is to investigate how individual investors' existing sustainability attitudes influence their investment preferences in sustainable financial assets. This involves examining the investor's educational background, motivations, decision-making processes, and behavioural patterns driving investors' choices in sustainable investments.

The central research question is formulated as follows: **To what extent do the sustainability attitudes of individual investors have an influence on investment preferences in sustainable financial assets?**

For the in-depth research, sub-questions were added:

1. What is the relationship between individual investors' willingness to sacrifice short-term financial gains for environmental benefits and their interest in socially responsible investment options?
2. What is the relationship between individual investors' sustainability attitudes and investing in sustainable financial assets?
3. What role does willingness to sacrifice short-term financial gains for environmental benefits play in shaping individual investors' prioritization of sustainability aspects in their investment decision-making?

2. THEORETICAL FRAMEWORK

Sustainability is a concept defined as a “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (Kuhlman & Farrington, 2010). The idea of sustainability incorporates three main dimensions: economic development, social development, and environmental protection. In the long term, the aim is “to achieve a higher quality of life for all people” (Kuhlman & Farrington, 2010).

Sustainable intangible assets

Competitive advantage and firm value are directly associated with the effective management of the company’s assets. Intangible assets are described as assets that lack physical substance but still hold economic value for an organization (Nichita, 2019). Intangible assets include knowledge, skills, intellectual property, relationships, and brand reputation. According to Chareonsuk and Chulalongkorn University (2010), intangible assets also include employee competence, engagement, customer satisfaction, and customer loyalty. There

are several key aspects of intangible asset management that should be considered by a company in order to call the management of non-financial assets sustainable:

To manage intangible assets sustainably, a company needs to recognize the value of its intangible assets and manage those in an ethical way, taking care of customers' safety and impact on society (Crane & Matten, 2016). Investments in intangible assets should align with the sustainability objectives and the overall vision of the company. Continuous research on the topic of potential ethical and environmental issues would help identify areas for management improvement.

Moreover, continuous employee knowledge enhancement on the topic of sustainability is crucial. This is usually done through training programs, knowledge and feedback-sharing workshops, and professional skills development learning opportunities that would improve the company's capacity for innovation, problem-solving, and decision-making. Building strong customer relationships, which implies customer satisfaction and loyalty prioritization through understanding and addressing their needs, preferences, and expectations, should also be considered. This could involve feedback gathering, responding to customer concerns, and delivering high-quality products or services (Chareonsuk & Chulalongkorn University, 2010).

According to Loyarte et al. (2020), intangible asset management is also expressed through continuous improvement of innovation activities by aligning business operations and activities with international standards such as ISO 14001 certification, which would decrease environmental impacts related to intangible assets.

Sustainable tangible assets

Sustainability from the business perspective is associated with an obligation of organizations to consider not only its economic advantages but also the impact business operations have on society and the environment. Sustainable real assets are defined as physical assets, such as infrastructure, equipment, and facilities, that are managed and utilized in a manner that minimizes negative impacts on society, the environment, and the economy (Ratnayake, 2013). According to Ratnayake (2013), stakeholders can assess a company's sustainable management of its tangible assets by analyzing several factors:

The company's commitment to social responsibility includes its treatment of employees, engagement with communities, and adherence to human rights standards and a safe work environment. Also, the company's environmental practices and performance, including its carbon footprint, resource use, pollution control measures, and wastage, address resource scarcity and global warming concerns. The company's engagement with stakeholders, including investors, customers, employees, and communities, and its response to public concerns and regulatory requirements related to environmental and social responsibility. Finally, the company's employment of the best available technology and practices. It implies the efficient regulation of a company's practices regarding the inspection, maintenance, and modification of its assets to prevent overexploitation and ensure safe and efficient functioning.

The sustainable management of the physical and not physical assets of a company are essential aspects of the evaluation of corporate sustainability; however, the sustainability of financial assets should also be considered. Sustainable financial assets can be defined as methods of finance and investments that combine financial returns with societal returns. These assets encompass investments in organizations and funds that aim to generate quantifiable benefits for society and/or the environment while also delivering a financial return (Financial Assets, 2023). The sustainability of the financial assets of a specific company can be assessed by various factors beyond the management of physical and non-physical assets. These factors include corporate governance, financial performance and strategic vision.

The company's governance structure and practices, including board composition, strategic direction, transparency, accountability, and alignment with stakeholder interests, have a direct impact on the sustainability of its financial assets. For example, the presence of independent directors on the board is a crucial factor in ensuring board independence from management. It brings objectivity and the presence of multiple perspectives in the decision-making process. Independent directors ensure accountability in the sense of pursuing the interests of both shareholders and stakeholders by pressuring a company to engage in sustainability practices (Michelon & Parbonetti, 2010).

The company's financial performance and environmental performance have a two-sided influence relationship. Companies with strong financial performance have the ability to allocate funds towards implementing sustainable practices, such as upgrading to energy-efficient technologies, reducing waste, or investing in renewable energy sources (Konar & Cohen, 2001). Environmental practices and initiatives address societal concerns positively, which impacts the company's financial health in the long run due to its good reputation and enhanced efficiency of operations.

The company's strategic vision and commitment to sustainability could be evaluated by looking at the company's sustainability practices inclusion into the corporate strategy and decision-making processes (Epstein & Roy, 2001). Companies that prioritize actions that have a positive impact on social outcomes are likely to be driven by alignment with their strategic objectives and vision. A sustainable strategic vision may involve implementing environmentally friendly practices and waste reduction activities, investing in renewable energy, promoting social equity and justice, and enhancing community engagement.

Sustainability attitudes

Sustainability attitudes could be described as expressions of values through actions and behaviours in relation to the development and environmental dimensions (Leiserowitz et al., 2004). Sustainability attitudes can offer insights into how individuals are likely to behave in specific situations. As an example presented in the literature, consumers expressing demand for eco-friendly products would possibly be more attracted to companies investing in sustainable sourcing and packaging practices, which is the topic of interest for this research.

According to Ali (2011), investors' attitudes play a significant role in their decision-making processes regarding company analysis, performance valuation, and asset management. Individual investors often rely on their subjective perceptions and attitudes when making investment decisions, even after evaluating the financial positions of companies (Ali, 2011). For instance, investors who consider an organization's impact on society or customer relationship-building aspects in their investment decision-making would probably be more attracted to the firms that manage their intangible assets sustainably. Investors are concerned that adherence to human rights standards or pollution control measures would possibly imply investors are more attracted to companies that actively engage in tangible assets and sustainable practices. The research highlights that investors are more likely to invest in companies that align with their values and beliefs about sustainability.

Key aspects of sustainability attitudes identified by Leiserowitz et al. (2004).

- Attitudes toward human development and well-being:

There is an assumption that people generally support initiatives that improve their quality of life, such as better healthcare, improved child survival rates, increased life expectancy, and enhanced educational opportunities. On the other hand, deterioration in living conditions, job availability and healthcare affordability are happening, which is a topic of increased concern for society nowadays.

- Attitudes toward economic development:

Economic development across all countries is viewed as a central priority for society nowadays and the key component necessary for sustainable development. However, there are varying opinions on the methods of achieving economic growth and distribution of wealth. Some people prioritize economic growth to improve their living standards, while others prefer a more equitable distribution of resources. These attitudes shape decisions on economic policies and trade-offs between growth and social welfare and differ for some countries.

- Attitude towards development assistance:

Despite the common focus on the importance of local development, there's widespread public support for helping developing countries instead. However, there are also a lot of doubts about how the aid is utilized and what is the real impact on development. These attitudes influence decisions on foreign aid budgeting, resource allocation, impact policies and the implementation of development programs.

- Attitudes towards environmental policies:

Environmental protection is a topic of concern for society as well, indicating the widespread awareness and acknowledgement of environmental challenges. There is worldwide support for stronger environmental protection laws and regulations, prioritizing environmental protection over economic growth. However, it is mostly initiated by large and powerful entities and less by individuals' intrinsic motivation.

- Attitudes towards paying more for environmental benefits:

The environmental values and attitudes could be translated into consumer behaviour and actions aimed at reducing environmental impact, such as recycling and choosing environmentally friendly products. However, there is a varying degree of willingness to pay higher prices for some environmentally friendly products or to support initiatives aimed at reducing environmental harm, which indicates the complex relationship between attitudes toward environmental issues and economic trade-offs.

The difficulty in balancing environmental issues and economic trade-offs is considered to be caused by the varying sustainability attitudes of the public. According to Foy (1990), one of the challenges is the feasibility of accurately valuing environmental benefits. Public attitude towards certain environmental aspect's value depends on subjective monetization of the environmental benefits. Easily measurable values are often prioritized, whereas the intrinsic value of ecosystems for human life support, for example, might be overlooked. This means that crucial environmental benefits, especially those that are hard to measure monetarily, might be undervalued in economic decision-making. The existing attitudes towards the possibility of man-made capital being able to fully substitute natural capital also challenge the balance between economic development and the preservation of environmental assets. The evaluation of the needs of future generations is uncertain, which makes it difficult to assess the potential costs and benefits of present actions on the future environmental state (Foy, 1990).

Investment preferences

Investors make decisions based on varying psychological, emotional, and cognitive factors. These include emotions like excitement or fear, thoughts about potential gains or losses, and the way the brain responds to different situations (Peterson, 2005). Investors' behaviour is usually guided by their expectations of potential rewards or losses from a deal. Positive expectations motivate investors to pursue rewards, while negative expectations result in strategies to avoid as many losses as possible. According to Walia and Dr. Mrs. Ravi Kiran (2009), investors weigh factors such as risk and return as the first step they make when making investment decisions. Investors seek to balance the potential for higher rewards with the risk involved, often relying on past performance as an indicator of future success.

Furthermore, according to Borgers and Pownall (2014), investment decisions are also influenced by attitudes towards sustainability aspects. For example, people having a negative attitude towards smoking, drinking, or violent behaviour prioritize the exclusion of companies from the alcohol, tobacco, and gaming industries and those in the weapons industry from their portfolios, indicating their concerns about social responsibility and a link between attitudes and investment preferences. Empirical studies have shown that significant segments of consumers are willing to pay for environmental or ethical features in products (Borgers & Pownall, 2014). This willingness to pay suggests that at least some individuals prioritize their non-financial preferences, such as sustainability values, when making investment decisions. However, the literature also highlights that introducing a social responsibility attribute apart from evaluating risk and revenue to investment decisions may complicate financial choices for individuals, especially those with lower levels of financial literacy. This implies that individuals with higher levels of financial literacy are more likely to make sophisticated financial choices aligning with their non-financial preferences if there are some (Borgers & Pownall, 2014).

Based on the theoretical framework, the hypotheses aligned with the research sub-questions were formulated:

H1: Individual investors with a higher willingness to sacrifice short-term financial gains for environmental benefits will show greater interest in socially responsible investment options.

H2: Individual investors' sustainability attitudes have a significant influence on investment in sustainable financial assets.

H3: Individual investors with a higher willingness to sacrifice short-term financial gains for environmental benefits are more likely to prioritize sustainability aspects, in addition to considering the risk-reward ratio, when making investment decisions in sustainable financial assets.

3. METHOD AND DATA

3.1 Research Design

The aim of this study is to identify to what extent sustainability attitudes have an impact on investment preferences in sustainable financial assets, for which a quantitative approach is chosen. The quantitative approach is used to identify the relationship between research variables and analyze data through statistical analysis for further interpretation. Findings can also be applied to a larger population beyond the sample studied based on the analysis of patterns and relationships, which is an advantage of the quantitative approach (Rahman, 2016). In the scope of the research, the main variables of interest include sustainability attitudes, interest in socially responsible investment options,

investment preferences in sustainable financial assets and willingness to pay for environmental benefits, so sacrifice short-term financial returns over environmental benefits. The sustainability attitude variable refers to the perceptions related to environmental, social, and governmental factors in investment decision-making.

3.2 Data Collection

The participants in this study are selected from a diverse pool of individuals representing different demographic backgrounds, specifically education levels. Additionally, the level of financial literacy and the number of years of investing are also taken as independent variables in this research. The necessary data collection procedure is implemented through questionnaire distribution and analysis of the answers collected. The questionnaire includes only multiple-choice questions, which provide structured data that can be easily analyzed.

The data collection sampling method is chosen to be convenience sampling, implying that participants are chosen based on their availability and accessibility, so those who are easily reachable through social media platforms. The data for the study was acquired through a questionnaire distributed among investors within the first and second connections on LinkedIn. According to Champion and Sear (1969), the questionnaire response rate depends on several factors, such as the length of the questionnaire and possible incentives, which gives an expected response rate of 35%. The sample size is determined to be 50, and the practical feasibility of recruiting and obtaining data from participants is assessed to ensure adequate power for analysis, which requires 143 individuals to receive the questionnaire.

The main reason for the choice of social media is that LinkedIn gives an opportunity to reach people from professional industries having a higher education and more experience in investments. The research questions were approved by the BMS Ethics Committee of the University of Twente (Request number: 240814) to make sure the research adheres to ethical guidelines and principles.

3.3 Research Instrument

Questionnaires, as the main data-gathering instrument, provide an efficient way to collect data, especially when research aims to reach a large number of respondents (Patten, 2016). Time efficiency is also a benefit as the questionnaire allows data gathering from many people simultaneously. The analysis of the gathered data also is simplified, especially for the multiple-choice questions. The questionnaires' responses can be analyzed anonymously, which encourages respondents to be truthful in their responses (Patten, 2016). This anonymity is valuable when collecting information on sensitive matters, such as investment preferences. The disadvantages of the approach include often low response rate, lack of opportunity to ask for elaboration, and the possibility of giving socially desirable responses (Patten, 2016). To diminish the negative aspects of a questionnaire, it is distributed to a greater number of people than the number of respondents required for statistical analysis. The questions are designed to make the responses anonymous, which may reduce the effects of social desirability.

The questionnaire is intentionally designed to be concise, taking only 3-5 minutes of the respondents' time, which is crucial for motivating participants to read the questions carefully and answer thoughtfully. By ensuring that the questionnaire was short, the likelihood of respondent withdrawal was reduced, and the quality of the responses increased, being suitable for subsequent statistical analysis. The questions were carefully crafted to gather the necessary data to analyze the correlation between the independent variables (such as demographic factors and financial literacy) and the dependent variables (investment preferences in sustainable financial assets). The questionnaire was built and distributed through Qualtrics, an online survey tool that is convenient for collecting responses.

3.4 Data analysis

This study employs quantitative research, which involves collecting and analyzing numerical data to test hypotheses, identify patterns, and quantify relationships between variables. Once the data collection phase was completed and the response rate exceeded 50 participants, the responses were compiled into an Excel file for further analysis. The Excel file contained all the raw data from the questionnaire, which was cleaned by checking for missing values. To proceed with a more detailed analysis, the data was then transferred to SPSS, where categorical responses were converted into numerical codes for statistical analysis. Various statistical techniques like frequencies, percentages, and measures of central tendency (mean, median) for multiple-choice answers are calculated in order to describe the distribution of responses regarding independent variables. For dependent variables, the normality of the distribution is checked. Correlation analysis is applied to identify the factors that influence the investment preferences of individual investors. It is used to examine the impact of variables of interest, like demographic variables or sustainability attitudes, on the investment preferences variable. The regression analysis conducted in SPSS helped in identifying the strength and direction of these relationships, providing valuable insights into how different factors influence investment preferences. Additionally, hypothesis testing was performed to validate our assumptions and determine the statistical significance of the observed patterns. Regression analysis is perfect for the exploration of the relationships between multiple independent variables and a dependent variable.

The research may also reveal other factors that influence investment preferences in sustainable financial assets, which are more relevant for investors.

4. RESULTS

The findings of the study aim to identify the extent to which sustainability attitudes impact investment preferences in sustainable financial assets for individual investors. The questionnaire's answers help to identify sources of information investors rely on, as well as the role of sustainability attitudes in investment decision-making. The research focused on the aspects of sustainability investors prioritize in their investment decisions and the importance of investment portfolio alignment with personal values and beliefs.

Table 1. Variable definition table

Variable type	Variable Symbol	Variable Index	Definition	Measurement scale
Dependent variable	Interest in socially responsible investment options	SR	The level of interest in socially responsible investment options	A 10-point Likert scale
	Sustainability score	SS	Aspects of sustainability prioritized in the investment	Discrete scale

			decision making	
	Sustainability attitudes	SA	Individual investors' importance of sustainability prioritization	A 5-point Likert scale
	Investment behavior	IB	Investment preferences in sustainable financial assets	Ordinal scale
Independent variables	Willingness to pay for environmental benefits	WTP	Investors with willingness to sacrifice short-term financial gains for environmental benefits	A 10-point Likert scale
	Sustainability attitudes	SA	Individual investors' importance of sustainability prioritization	A 5-point Likert scale
Other variables	Sources of information	S	Sources of information used when making investment decisions	Nominal scale
	Portfolio alignment with personal beliefs	PA	The importance of portfolio alignment with investors personal values and beliefs	A 10-point Likert scale
	Education	E	The highest degree or level of education the participant acquired	Ordinal scale
	Financial Literacy	FL	The rate of investors level of financial literacy	Interval scale
	Years of investing	YI	The number of years investing	Interval scale

The sample consisted of 56 respondents distributed among three groups of the highest degree or level of education the participants acquired.

Table 2. Demographic characteristics (N = 56)

		Frequency	Percentage
Education	High school or equivalent	20	36%
	Bachelor's Degree	22	39%
	Master's Degree	14	25%

4.1 Descriptive Statistics

The distribution of responses for continuous variables like financial literacy ratings, years of investing experience, and willingness to pay for environmental benefits is summarized using measures of central tendency (mean, median, mode) and standard deviation. For categorical variables like educational background and sustainability attitudes, numerical coding is applied. In the data analysis for this research, high school education is labelled as 1, bachelor education as 2 and master's degree as 3. The sustainability attitude was measured through the scale of importance, where "Not important at all" is coded as 1 and "Very important" as 5. As can be seen in Table 3, mean, median and mode are approximately equal for the first three variables and sustainability attitudes, whereas the mode for the willingness to pay for environmental benefits clearly indicates skewness.

Table 3. Central Tendency of independent variables and other variables

	Mean	Median	Mode	SD
Education	1.89	2	2	0.78
Financial Literacy	6.88	7	7	1.67
Years of investing	2.82	3	3	0.86
Willingness to pay for environmental benefits	3.84	4	0	2.78
Sustainability attitudes	3.25	4	4	1.10

For the dependent variables like interest in socially responsible investment options, sustainability score, sustainability attitudes and investment behaviour, the Shapiro-Wilk Test is performed to indicate whether a sample comes from a normal distribution (Table 8 in the Appendix). For all four variables, the test showed a p-value smaller than 0.05, which rejects the null hypothesis that the data is normally distributed. As the normal distribution cannot be assumed for any of the variables, the most suited measurement used for correlation would be Spearman's Rank Order.

In the scope of this research, the main sources of information investors rely on when making investment decisions were identified. From the Table 4, it is seen that financial reports and news channels have the biggest impact on the decision-making process, whereas personal knowledge and experience make the least contribution.

Table 4. Sources of information

		Frequency	Percentage
Sources of information	Analyst reports	28	50.0%
	Financial reports	36	64.3%
	News channels	33	58.9%
	Social media	20	35.7%
	Personal knowledge and experience	13	23.2%

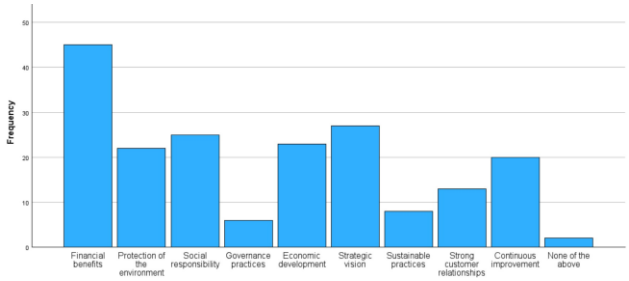
The questionnaire also focuses on the aspects of sustainability that investors prioritize in their investment decisions, if there are any. Overall, the majority of people prioritize financial benefits over other aspects of sustainability. However, there are many people concerned about social responsibility, environmental protection, the strategic vision of a company and economic development, which can be observed in Table 5 and Figure 1 for better visualization below.

Table 5. Aspects of sustainability prioritized

		Frequency	Percentage
Aspects of sustainability	Financial benefits	45	80.4%
	Environmental protection	22	39.3%
	Social responsibility	25	44.6%
	Governance practices	6	10.7%
	Economic development	23	41.1%

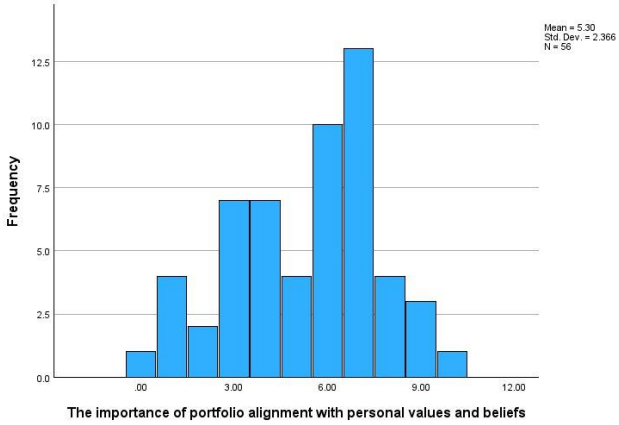
	Strategic vision of a company	27	48.2%
	Sustainable practices inside the company	8	14.3%
	Strong customer relationships	13	23.2%
	Continuous improvement of the innovation activities	20	35.7%
	None of the above	2	3.6%

Figure 1. Aspects of sustainability prioritized



Additionally, the research aimed to discover whether individual investors find it significant to align their investment portfolios with personal values and beliefs, which might have a direct impact on the hypothesis approval or disapproval reasoning. Figure 2 below represents the distribution of the responses regarding the importance of portfolio alignment with personal values and beliefs.

Figure 2. Portfolio alignment with personal beliefs



The data on the sources of information investors rely on, as well as portfolio alignment with personal beliefs, was collected for exploratory purposes and potential future studies.

4.2 Inferential Statistics

To examine the relationships between sustainability attitudes and investment preferences by testing hypotheses, inferential statistical analyses are performed, including correlation analysis and regression analysis.

Spearman's rank order correlation coefficient is used to examine the relationship between level of education, financial literacy, and years of investment experience, with dependent variables such as sustainability attitudes and interest in socially responsible investment options. From Table 6.1, multicollinearity issues among independent variables could be identified. The two independent variables (years of investing and financial literacy) are highly correlated, which makes it difficult to determine the individual effect of each independent variable on the dependent variables. However, overall, the correlation between independent and dependent variables is not significant.

Table 6.1. Correlation

	E	FL	YI	SA	SR
E	1.000				
FL	-0.005	1.000			
YI	0.212	0.501**	1.000		
SA	0.097	-0.130	-0.134	1.000	
SR	-0.122	-0.045	-0.046	0.426**	1.000

**. Correlation is significant at the 0.01 level (1-tailed)

Spearman's rank order correlation coefficient is also used to examine the relationship between willingness to pay for environmental benefits with dependent variables such as sustainability attitudes and interest in socially responsible investment options. From Table 6.2, a significant correlation between variables could be observed.

Table 6.2. Correlation

	WTP	SA	SR
WTP	1.000		
SA	0.558**	1.000	
SR	0.669**	0.426**	1.000

**. Correlation is significant at the 0.01 level (1-tailed)

Regression analysis is used to explore the impact of willingness to sacrifice short-term financial gains for environmental benefits on interest in socially responsible investment options. Also, the relationship between individual investors' sustainability attitudes and investing behaviour is analyzed. The role other variables like financial literacy, education, years of investing and portfolio alignment play in investors' decision to take sustainability attitudes into account while evaluating investment options is also estimated. Result interpretation is used for hypothesis testing.

Hypothesis 1 (Table 7): Multivariate analysis is applicable in cases dealing with multiple dependent variables and multiple independent variables. Multivariate Analysis of Variance (MANOVA) for continuous dependent variables is used to test the effect of willingness to pay for environmental benefits (WTP) and interest in socially responsible investment options (SR). The null hypothesis (H0) is a statement that there is no relationship between the predictor variable (willingness to pay for environmental benefits) and the dependent variable (interest in socially responsible investment options), whereas the alternative hypothesis (H1) states that there is a significant relationship between the predictor variable and the dependent variable.

The B coefficient indicates the strength of the relationship between the independent variable and the dependent variable. A larger absolute value of B indicates a stronger relationship. Willingness to pay for environmental benefits has the highest B coefficient with the variable of interest in socially responsible investment options. The regression equation for the interest in socially responsible investment options was derived from a multivariate analysis where SR serves as the dependent variable. The equation 1 indicates that when all independent variables are held constant, each unit increase in WTP contributes to a 0.435 unit increase in SR. Similarly, FL shows a significant positive impact on SR with a coefficient of 0.307 ($p = 0.043$).

$$SR=1.223+0.435\times WTP+0.221\times SA-0.252\times E+0.307\times FL-0.044\times YI+0.173\times PA \quad (1)$$

Moreover, the predictor variable is significant ($p < 0.001$), confirming that the relationship is highly significant at the 0.1% level, and it has a significant impact on the dependent variable and strong evidence against the null hypothesis. R^2 of 0.537 indicates that 53.7% of the variance in SR can be explained by

the independent variables included in the model. The adjusted R^2 =0.481 adjusts for the number of predictors, suggesting that 48.1% of the variance is explained, reflecting a robust fit of the model to predict SR.

Hypothesis 2 (Table 7): The null hypothesis (H0) is a statement that there is no relationship between the predictor variable (sustainability attitudes) and the dependent variable (investment behaviour of individual investors), whereas the alternative hypothesis (H1) states that there is a significant relationship between the predictor variable and the dependent variable. The regression equation 2 for the Sustainability Score was formulated to predict the variable based on the same set of independent variables used for SR. The equation derived from the analysis is:

$$IB = -0.203 + 0.069 \times WTP + 0.168 \times SA + 0.163 \times E + 0.103 \times FL + 0.244 \times YI + 0.058 \times PA \quad (2)$$

This equation 2 suggests that none of the independent variables (WTP, SA, E, FL, YI, PA) have statistically significant effects on SS, as indicated by their respective p-values. Therefore, in this model, these variables do not reliably predict IB. The predictor variable, with a significance level of p =0.371, rejects that it has a significant impact on the dependent variable since the p-value is greater than 0.05 and shows no evidence against the null hypothesis. R2 of 0.192 indicates that 19.2% of the variance in IB is explained by the included independent variables. The adjusted R2 = 0.093 suggests that the model's explanatory power is limited when adjusted for the number of predictors, with only 9.0% of variance explained.

Hypothesis 3 (Table 7): Multivariate Analysis of Variance (MANOVA) for continuous dependent variables is used to test the effect of willingness to pay for environmental benefits (WTP) and sustainable aspects prioritization in investment decision-making (SS). The null hypothesis (H0) is a statement that there is no relationship between the predictor variable (willingness to pay for environmental benefits) and the dependent variable (sustainability score), whereas the alternative hypothesis (H1) states that there is a significant relationship between the predictor variable and the dependent variable. The equation 3 indicates that when all independent variables are held constant, each unit increase in WTP contributes to a 0.048 unit increase in SS.

$$SS = 0.774 + 0.048 \times WTP + 0.333 \times SA - 0.009 \times E - 0.120 \times FL + 0.302 \times YI + 0.098 \times PA \quad (3)$$

The predictor variable, with a significance level of p=0.162, rejects the significant impact on the dependent variable since the p-value is greater than 0.05 and shows no evidence against the null hypothesis. R^2 0.190 indicates that 19.0% of the variance in SS is explained by the included independent variables. The adjusted R^2 = 0.090 suggests that the model's explanatory power is limited when adjusted for the number of predictors, with only 9.0% of variance explained.

Table 7. Regression results

	Dependent variables		
	SR	SS	IB
Independent variables			
WTP	0.435 (<0.001) ***	0.048 (0.597)	0.069 (0.337)
SA	0.221 (0.405)	0.333 (0.162)	0.168 (0.371)
Other variables			
E	-0.252 (0.408)	-0.009 (0.975)	0.163 (0.447)
FL	0.307 (0.043) *	-0.120 (0.369)	0.103 (0.328)
YI	-0.044 (0.884)	0.302 (0.265)	0.244 (0.256)
PA	0.173 (0.132)	0.098 (0.337)	0.058 (0.468)
Tests			
Intercept	1.223	0.774	-0.203
R^2	0.537	0.190	0.192
Adjusted R^2	0.481	0.090	0.093

5. CONCLUSIONS

The research question aimed to identify to what extent individual investors' sustainability attitudes influence investment preferences in sustainable financial assets. To achieve this objective, the presented research question has been translated into three sub-questions, which formed the basis for establishing hypotheses. Each variable present in the hypotheses has been analyzed based on the data collected. These measurements allowed for hypothesis testing and conclusions drawn about sustainable investment preferences.

The regression analysis runs to test the first hypothesis, which shows significant results for the relationship between variables. Willingness to pay for environmental benefits significantly predicts interest in socially responsible investments, explaining 53.7% of the variance. The obtained result indicates that investors who are willing to sacrifice short-term financial gains for environmental benefits are more likely to be interested in socially responsible investment options. The second hypothesis, which focused on identifying the relationship between sustainability attitudes and investment behaviour, could not be proven. The regression analysis demonstrated that personal sustainability attitudes alone do not significantly influence investment behaviour, as only 19% of the variance in investment behaviour was explained. The analysis of the third hypothesis showed that there is a non-significant correlation between willingness to sacrifice short-term financial gains for environmental benefits and prioritization of sustainability aspects in investment decisions, as only 19.2% of the variance in sustainability scores was explained through a regression model.

5.1 Practical Implications

The results of this research could provide significant insights for several parties involved in financial asset investing. Companies aiming to promote their sustainable financial assets should aim their marketing campaigns at people ready to sacrifice short-term financial gains instead of focusing on individuals with strong sustainability attitudes or high education levels. Financial institutions might focus on financial education that addresses the topic of sustainable investments, as the research indicates the limited influence of financial literacy or formal education on integrating sustainability into investment choices. Moreover, governmental institutions could consider practices directed to public awareness to increase the importance of considering environmental benefits in investment decisions since the results of the research indicate that the sustainability attitudes of individuals are barely reflected in their investment decisions.

5.2 Theoretical Implications

According to the analysis of the recent research by the Heeb et al. (2022), a substantial pool of investors prioritizes investments in sustainable assets or companies, which contradicts the results of this research. Aspects of sustainability prioritized by investors highlight the significant preponderance of respondents prioritizing financial returns over sustainability aspects (Figure

1). According to Leiserowitz et al. (2004), a varying degree of willingness to pay higher prices for some environmentally friendly products was highlighted, indicating the complex relationship between attitudes toward environmental issues and economic trade-offs. The mode of 0 for the variable measuring willingness to sacrifice short-term financial gains for environmental benefits (Table 3) proves the absence of growth in the interest in sustainable investing and contributes to the theory. The results of the analysis of information sources investors use for their decision-making process align with the literature, which suggests that financial reports and news channels are the most popular choices. These results emphasize the importance of reliable and timely information in investment decisions (Slovic, 1972). However, individual investors' subjective perceptions and attitudes were indicated to be less important in the investment decision-making process, which significantly challenges existing literature. The Walia and Dr. Mrs. Ravi Kiran (2009) findings state that investors prioritize factors such as risk and return when making investment decisions, often relying on past performance as an indicator of future success. These results were supported by this research. Borgers and Pownall's (2014) research suggests that investment decisions are also influenced by attitudes towards sustainability aspects, but this has not been proven.

5.3 Limitations

There are some limitations of the research, which could have an impact on the findings of the analysis. First, convenience sampling was chosen as the main sampling method, which implied reaching participants based on their willingness and ease of access, mainly through connections on LinkedIn. This approach may result in selection bias, as the sample might not be representative of the broader population of investors. There is a possibility of study participants having higher education or more professional work experience than the average investor, reducing the results' generalizability. The other limitation is the relatively small sample size of 56 respondents, which makes it difficult to achieve high statistical power and may lead to inaccurate estimations. Moreover, the questionnaire consisted solely of multiple-choice questions, which provided limited flexibility for the respondents' answers. This approach did not allow participants to elaborate on their answers and provide their reasoning and motivations, limiting the overall depth of responses. Additionally, the study focused on a limited set of demographic variables, which are education level, financial literacy, and years of investing. Other potentially influential factors, such as risk tolerance or cultural background, were not considered in the scope of this research. This resulted in possibly omitting critical variables that could have an effect on investment preferences. Furthermore, variables like financial literacy were measured using a self-evaluation scale, which did not have any correlation with education level. This fact shows that the subjective assessment used is most likely not precise. Additionally, the Shapiro-Wilk Test indicated that the dependent variables were not normally distributed. Non-normal distribution can affect the validity of the correlation and regression analyses, leading to potential inaccuracies in the results and conclusions. Spearman's rank order, which was used to calculate the correlations of the variables, also revealed multicollinearity issues, particularly between years of investing and financial literacy. This suggests that these variables might be capturing similar dimensions of investment experience and knowledge.

5.4 Future Research

To improve the strength of future research and the ability to generalize the obtained results, several adjustments need to be considered. A larger sample size and employing random sampling can help ensure a more representative sample and enhance the statistical power and generalizability of the findings. The incorporation of the open-ended questions in the questionnaire can provide deeper insights into participants' motivations and reasoning, which might have a direct impact on the variables' correlation, as well as the identification of additional variables of interest. Moreover, financial literacy measurement should be implemented through objective assessment of understanding of financial concepts and financial literacy basics.

By addressing these limitations, future research can build on the current findings to provide a more comprehensive understanding of the factors influencing investment preferences in sustainable financial assets.

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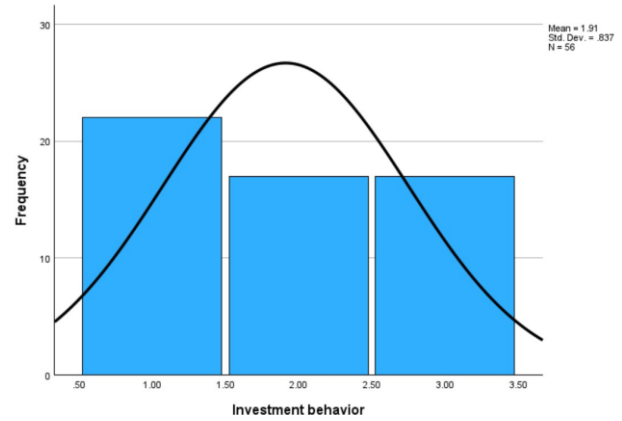
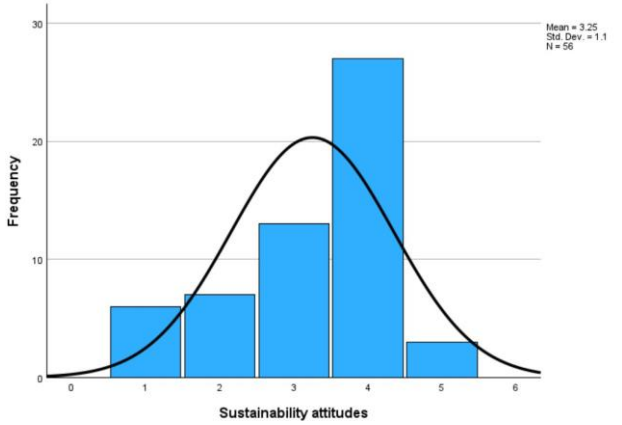
APPENDIX

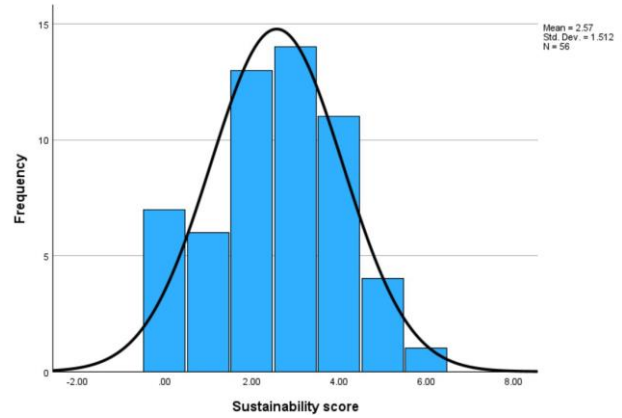
Table 8. Test of Normality

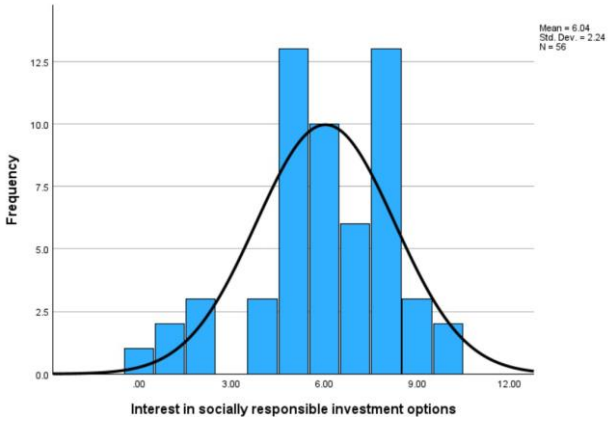
	Shapiro-Wilk test		
	Statistic	df	Significance
Investment behavior	0.783	56	<0.001
Sustainability attitudes	0.837	56	<0.001
Sustainability score	0.944	56	0.011
Interest in socially responsible investment options	0.934	56	0.004

Figure 3. Distribution of responses







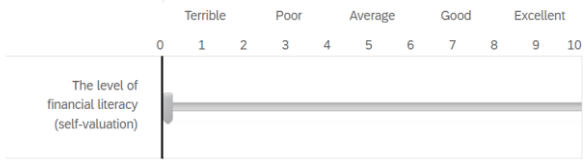


Questionnaire used for the research

Demographic Information: What is the highest degree or level of education you have completed?

- High school or equivalent
- Bachelor's degree
- Master's degree

How do you rate your level of financial literacy?



Investment Preferences: How long have you been investing in financial assets?

- Not investing
- Less than 1 year
- 1-5 years
- 6-10 years
- Over 10 years

What sources of information do you rely on when making investment decisions? (Select all that apply)

- Financial reports
- News channels
- Analyst reports
- Social media
- Personal knowledge and experience

How important is it for you to align your investment portfolio with your personal values and beliefs?

Do you currently invest in sustainable financial assets?

- No
- No, but I have intention to invest in such assets in the near future
- Yes

Sustainability Attitudes: How would you rate the importance of sustainability in your investment decisions?

- Very important
- Somewhat important
- Neutral
- Somewhat unimportant
- Not important at all

What aspects of sustainability do you prioritize in your investment decisions? (Select all that apply)

- [ ] Financial benefits
- [ ] Environmental protection
- [ ] Social responsibility
- [ ] Governance practices
- [ ] Economic development
- [ ] Strategic vision of a company
- [ ] Sustainable practices inside the company
- [ ] Strong customer relationships
- [ ] Continuous improvement of the innovation activities
- [ ] None of the above

To what extent do you agree with the statement: "Investing in sustainable financial assets is a responsible way to use my financial resources"?

To what extent do you agree with the statement: "I would be willing to accept a lower financial return on investment if it meant supporting a company with strong sustainability practices"?